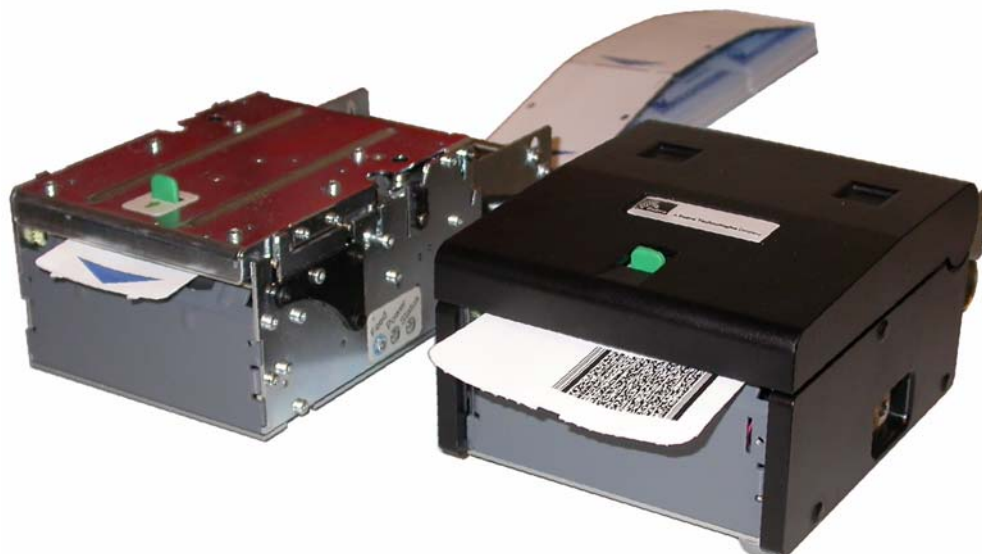




Zebra® TTP 2100

Kiosk Ticket Printer

Technical Manual



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Introduction

About this Manual

This manual will be updated as, from time to time, printer functions and features may be added or amended. You will always find the latest edition on our web site (<http://www.zebra.com>). If you require functions not found in this manual edition, please contact Technical Support for your region or the Zebra partner the printer was purchased from.

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Subject line: Emaillist

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Key: T: Telephone F: Facsimile E: E-mail			



Product Presentation

The TTP 2100 series of ticket printers are available both for kiosk integration and desktop use.



They print on most ticket media from 50 mm to 82.5 mm wide using direct thermal printing. The ticket media can be up to 0.25 mm thick, fanfold, roll, or single cut handfed.

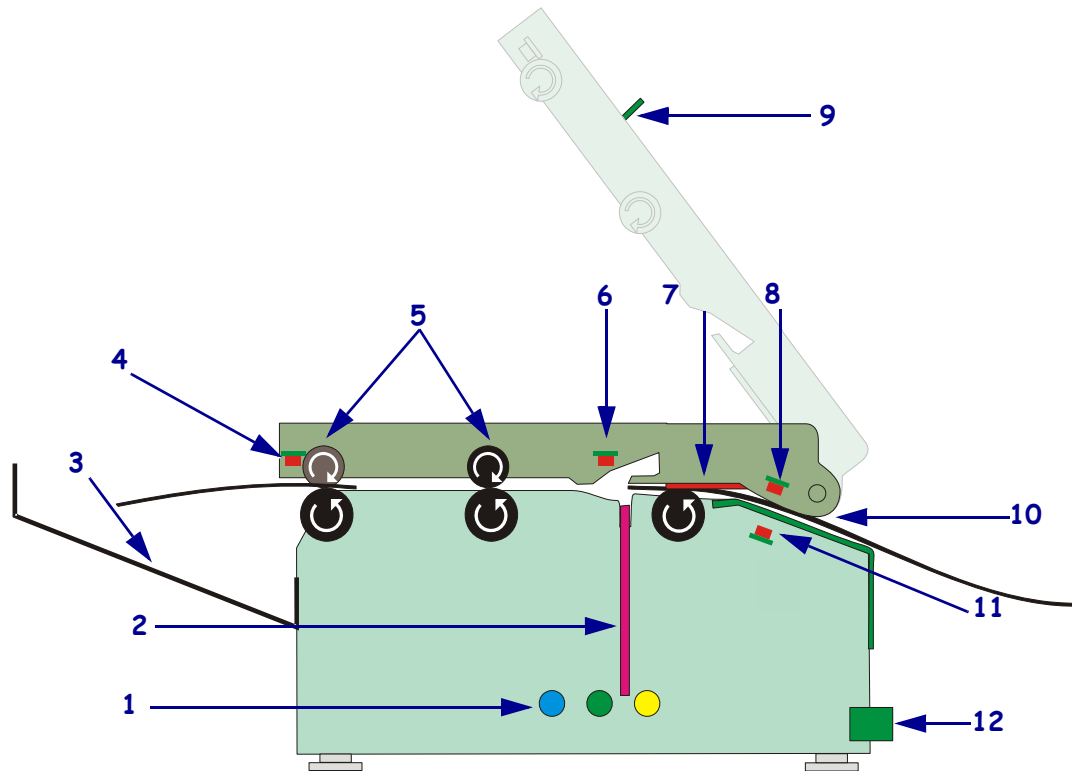
The printers have integrated guillotine cutter, straight presenter, and control board. The print speed is up to 150 mm per second and the eject speed 300 mm/s to ensure high throughput.

The cut can be synchronized with:

- Gaps between tickets, or punched holes
- Black-marks on the non thermal side of the ticket stock
- Foil opacity (for labels on opaque foil backing)
- Ticket corner radius
- Label gaps (for adhesive labels on backing/liner)

You can also print fixed- or variable-length tickets without synchronization. The presenter can be set to eject the ticket into a tray or hold it by the back edge until the customer takes it. The top can easily be opened to give the operator access to the paper path, and printhead, for maintenance purposes.

Figure 1 • Principle of Operation



1	Control panel on both sides
2	Cutter
3	Tickets fall (into tray)
4	Ticket sensor (taken/fallen)
5	Straight presenter
6	Ticket load sensor
7	Printhead
8	Upper media sensor (IR light source), adjustable sideways
9	Top release lever
10	Paper entry
11	Lower media sensor (IR light receiver), adjustable sideways
12	Control board

The upper media sensor is an IR light source that illuminates the media. The lower media sensor is an IR light receiver. These sensors must work together to sense media gaps or out-of-media conditions.

The printer is available with two different control boards; the TTP 2110 with serial interface and the TTP 2130 with USB interface.

A printer driver for Microsoft Windows™ is available, and the TTP 2130 interface is compatible with the Plug and Play standard.

The KPL control command language makes it easy to print directly from the ticket software without using a driver. This is especially useful for the serial interface version with its limited data transfer rate.

Presenter

The TTP 2100 does not loop the media. The presenter carries the media through the printer for presentation to the user.

Eject Mode

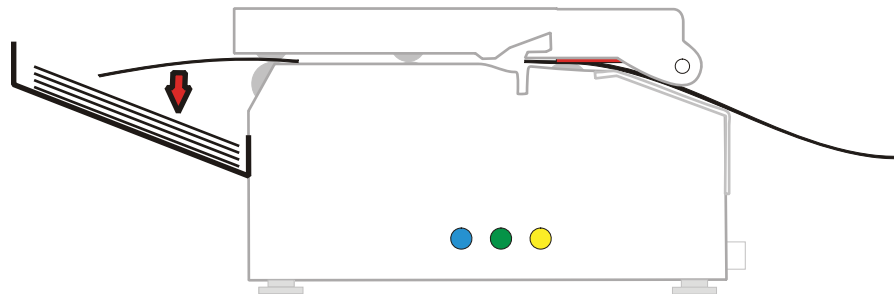
The ticket is ejected after being cut. The printer is designed so that the ticket always drops down. A sensor is located at the exit of the presenter to ensure that the printer can verify that the ticket drops down. To enable this functionality set “Clear presenter after print” in the driver printing preferences or enable the appropriate parameter setting if using direct print commands.

Hold Mode

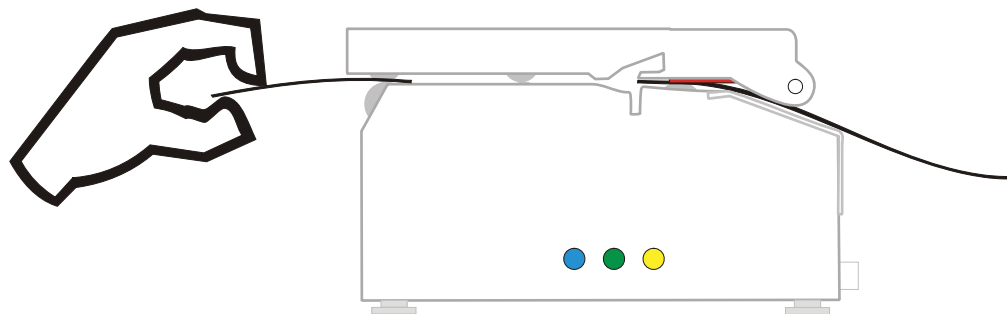
When presented, only the very end of the printout is held by the printer so the customer can easily take the printout no matter how long or short it is. If a customer is printing more than one ticket, the printer can detect when the first is taken and automatically print the next and hold that ticket until taken, continuing this process until all tickets have been printed.

Figure 2 • The Presenter

Print and drop

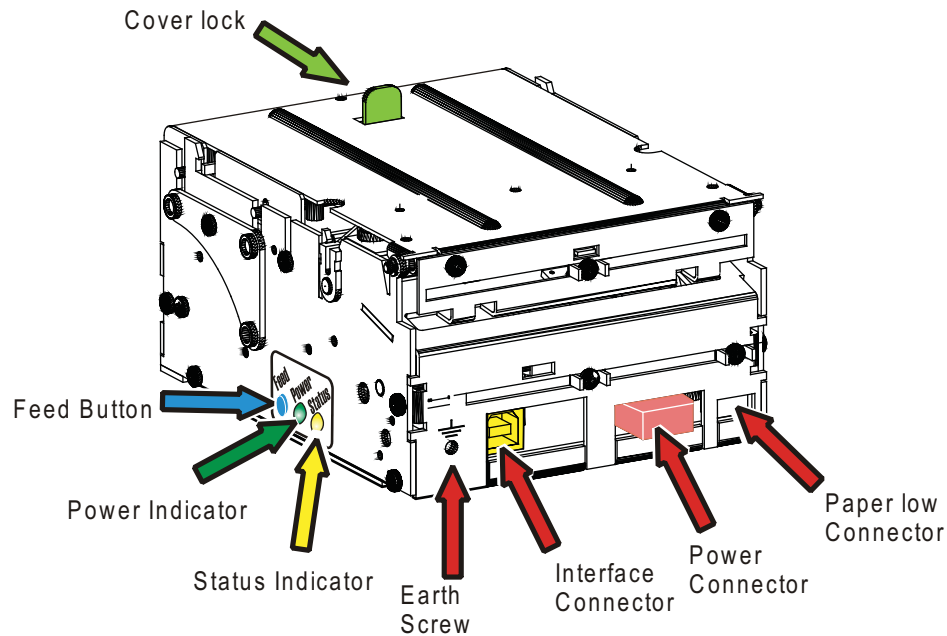


Print and take



Controls

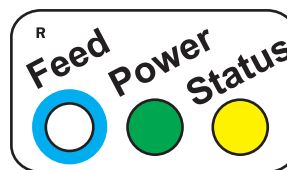
Figure 3 • Rear View



The buttons and indicators are duplicated on both sides of the printer so that they are easily accessible regardless of how the printer is installed.

Feed Button

The **Blue** Feed button has several functions:



- Press and release will feed, cut, and present a complete page.
- Any data in the print buffer will be printed.
If the buffer is empty the page will be blank.
In black-mark mode, the page will be synchronized with the black-mark.
- Press and hold Feed while turning on the power will print a self-test printout (See *Making a Self-Test Printout* on page 30).
- If the printer has firmware version 3.83 or higher, press and hold the Feed button for 3 seconds to print a self-test printout.
- With no paper in the printer, hold the Feed button pressed while closing the printhead to enter TOF mark calibration mode (see *Print Setup* on page 86).

Power Indicator

- When the green power indicator is illuminated, a 24V supply is connected to the printer.

Status Indicator

- The status indicator has several functions:
 - **ON constantly** — the printer is operational
 - **Flash, flash, pause, flash, flash** — is the warning-code for paper low.
The warning-code is reset automatically when the condition causing it is removed. This behavior is disabled by default but can be enabled by setting parameter 52 (Warning Level) to 1.
 - **Flashes rapidly** — indicates error. Hold down the Feed button and the number of flashes will reflect the *status-code*.

Table 1 • Status Indicator Flash Codes

Number of Flashes	Description
1	Presenter jam, paper cannot be ejected
2	Cutter cannot return to home position
3	Out of paper
4	Printhead lifted
5	Paper did not reach presenter sensor in time
6	Temp error, printhead is above 60°C
7	Paper jam during present
10	TOF mark not found (on media load)
11	TOF mark calibration error
Fast flashes	Checksum error at firmware loading
Steady light	Wrong firmware type
Constantly off	Waiting for paper in TOF mark calibration mode

Status codes are reset:

- When the conditions causing them are removed
- When the printer is power cycled (turned off and then on)
- For all paper jam conditions, after the jam is cleared, lifting and lowering the printhead.

Installation

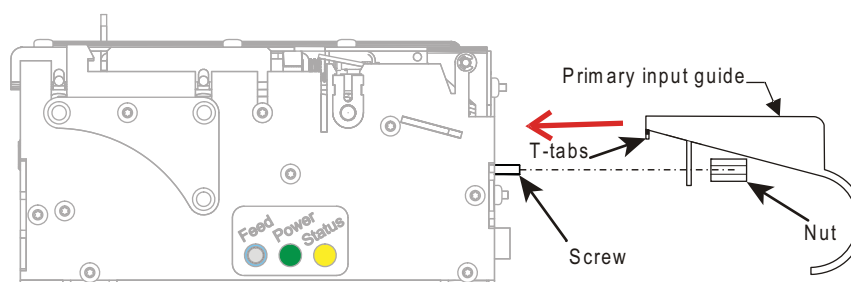


Installing a Paper Guide

The TTP 2100 printers are delivered without paper guide fitted.

1. Open the printhead by pushing the green printhead open lever backwards and lifting up the printhead. See *Clearing Paper Jams* on page 36.
2. Insert the T-shaped tabs of the paper guide into the “T”-holes, and press the rear of the guide down and in.
3. Fasten the nut using the 5 mm wrench supplied.
4. Close the printhead.

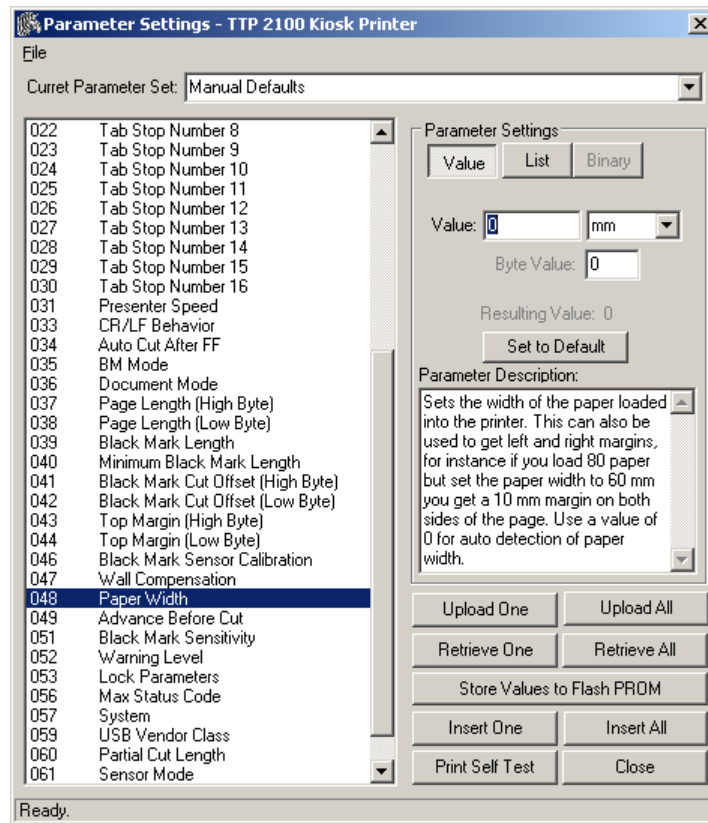
Figure 4 • Fitting the Paper Guide



When a guide is fitted, make an auto calibration with the ticket media that you are going to use in the printer. Most ticket medias auto calibrate perfectly, and the printer is ready to use. Should auto calibration fail on your media, set up paper width parameter n48, and sensor selected parameter n63 to reflect your media. Then redo the auto calibration.

5. Start the utility program Zebra Toolbox. This application is available from <http://www.zebra.com>.

6. Select Tools | Parameter Settings.



7. Select Parameter 48 (paper width) and enter the value in millimeters of the desired print width.

Paper Width	Setting
82.5 mm	n48=80
80 mm	n48=72
76 mm	n48=70
60 mm	n48=54
54 mm	n48=50
51 mm	n48=46

8. Select Upload One.

9. Select Parameter 63 (BM Sensor) and enter the desired value. Recommended values are:

Value	When Used
0	Auto selects 1 or 4 based on width of media loaded
1	(edge sensor) for ATB tickets without hole in the perforation.
2	(center sensor) for ISO tickets, most other ticket types, and adhesive labels

Value	When Used
3	17.5 mm from center sensor
4	12.5 mm from center sensor (for baggage tags according to IATA 740)

10. Select Upload One.
11. Select Store Values to Flash PROM.
12. Wait for the printer to buzz as a confirmation that the new value is stored.

Top of Form (TOF) Sensor

The TTP 2100 has a flexible top of form detection system. When delivered the printer is configured with fork (transmissive) sensor to detect holes/gaps between tickets. The holes/gaps should be in the paper center, 12.5 mm to the right of the center (according to IATA resolution 740) or at the edge of 82.5 mm wide tickets (Boarding cards).

If the TOF mark is at a suitable position, an auto calibration routine will configure everything for you.

You can move the sensor to other positions, force the printer to use a specific sensor, switch to reflex (black mark) sensor for black-mark detection by setting up the parameters in the printer.

Selecting Fork (Transmissive) or Reflex (Black Mark) TOF Sensor

The TTP 2100 can use a fork (transmissive) sensor that looks for holes between tickets, or a reflex (black mark) sensor that looks for black-marks on the back of the ticket stock. Sensor mode is selected with parameter n61, see *Summary of Parameter Settings* on [page 83](#).

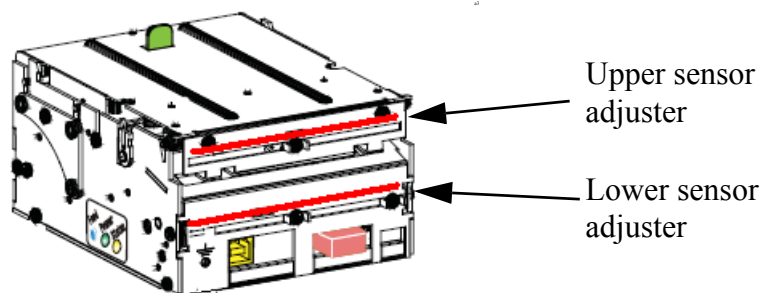
Positioning the TOF Sensor

The sensor board containing the lower media sensor sits on a bracket that can slide left and right in a groove. This bracket is located below the ticket entry. The IR light source (upper media sensor) sits on a similar bracket above the ticket entry. When delivered, the bracket is positioned to the far right. In this position Sensor 1 is at the right side ready to detect the corner radius of Boarding cards, Sensor 2 is at the center of the page, and Sensor 4 is 12.5 mm to the right of the center at the position determined for baggage tags in IATA resolution 740. To configure the printer for other papers that do not fall into any of the three categories, complete the following steps:

1. Loosen the screw holding the sensor 1 ½ turns.
2. Press the screw in with the screwdriver and carefully slide it to the new position making sure the cables to the sensor do not obstruct the movement.
3. Tighten the screw.
4. Move the IR light source (upper media sensor) to the same position, directly above the sensor.



Note • The standard ticket guides have holes for the following sensor positions: Center, Edge, and 12.5 mm from center, and the sensor position must correspond to these holes.



Calibrating the TOF Sensor

1. Open the printhead.
2. Remove ticket stock.
3. Press and hold the Feed button, and then close the printhead (keeping the button pressed all the time).
4. Release the button.
The Status LED should be off.
5. Load ticket stock (slide it into the paper guide and let the printer auto load the paper).



Note • To ensure good calibration conditions, lightly press the ticket stock towards the bottom of the input guide during calibration.

The printer will forward the paper until it finds two TOF marks and then stop and save all TOF-mark parameters.

6. Open the printhead and remove the ticket stock.
7. Close the printhead and feed the tickets in through the paper guide again.
The printer is ready for use.

Repeat this procedure if the calibration fails or if the printer is used with tickets that differ from the original specification.



Note • If you use the Dual guide 01990-400 on your printer, you must calibrate twice (once in the wide paper path and once in the narrow). The printer will choose the appropriate set of parameters based on which paper path contains ticket stock.

Installation Considerations

The TTP 2100 Kiosk is for embedded applications and should be installed in an enclosure such as a self-service kiosk.



Caution • NEVER use screws that go into the printer more than 4 mm! Longer screws will destroy the electronics inside.

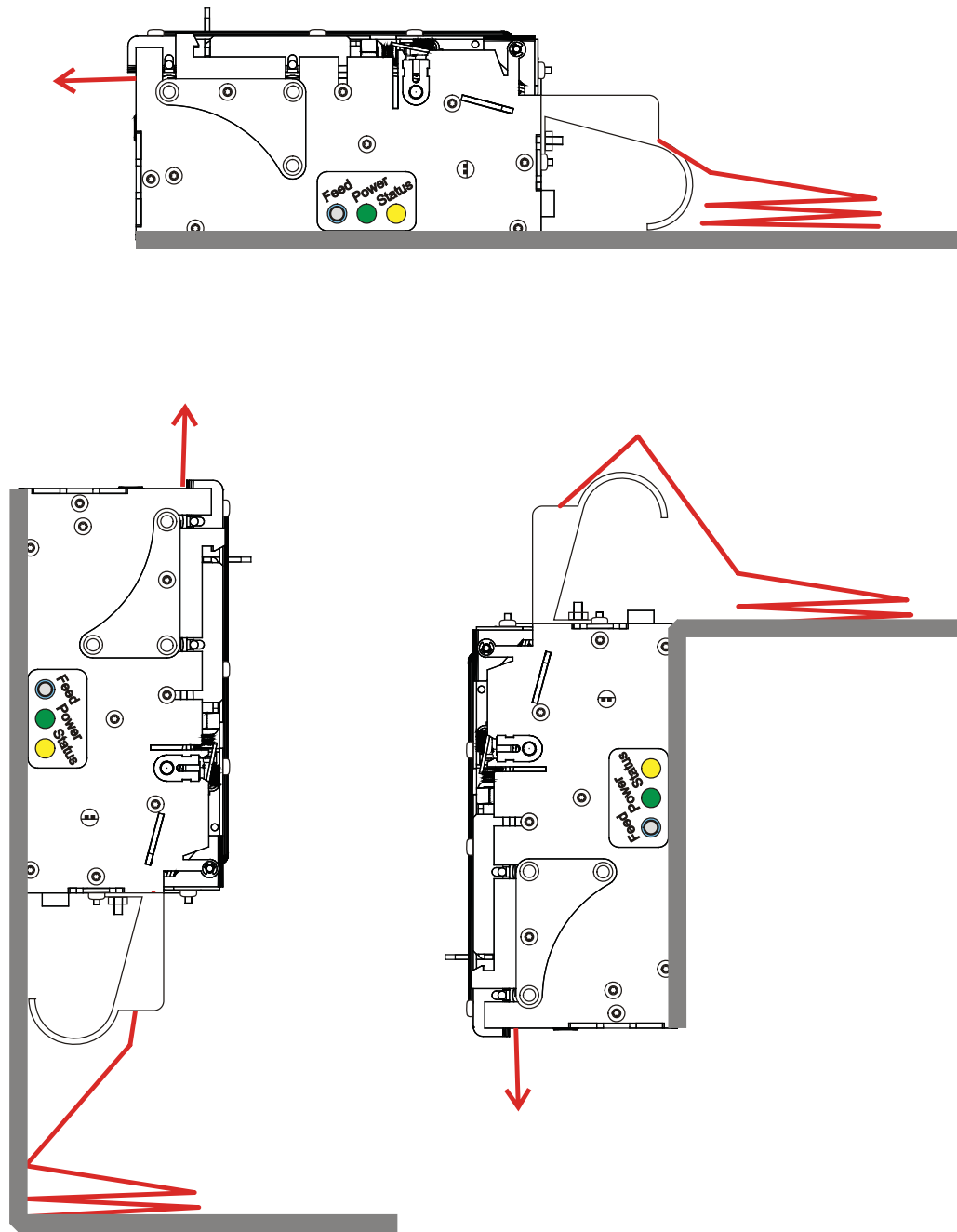
The “TTP 2100 Desktop” is a stand alone printer in a housing. The housings can be stacked so two or more printers can reside on top of each other to save space.



Orientation

The TTP 2100 can be installed at any angle. Horizontal is the most common use but vertical with the ticket presenting upwards can be used if you want the ticket to come up from the desk surface. Vertical with the ticket presented downwards can be used if you want to stack many tickets before picking them up.

Figure 5 • Printer Installation Orientation Options

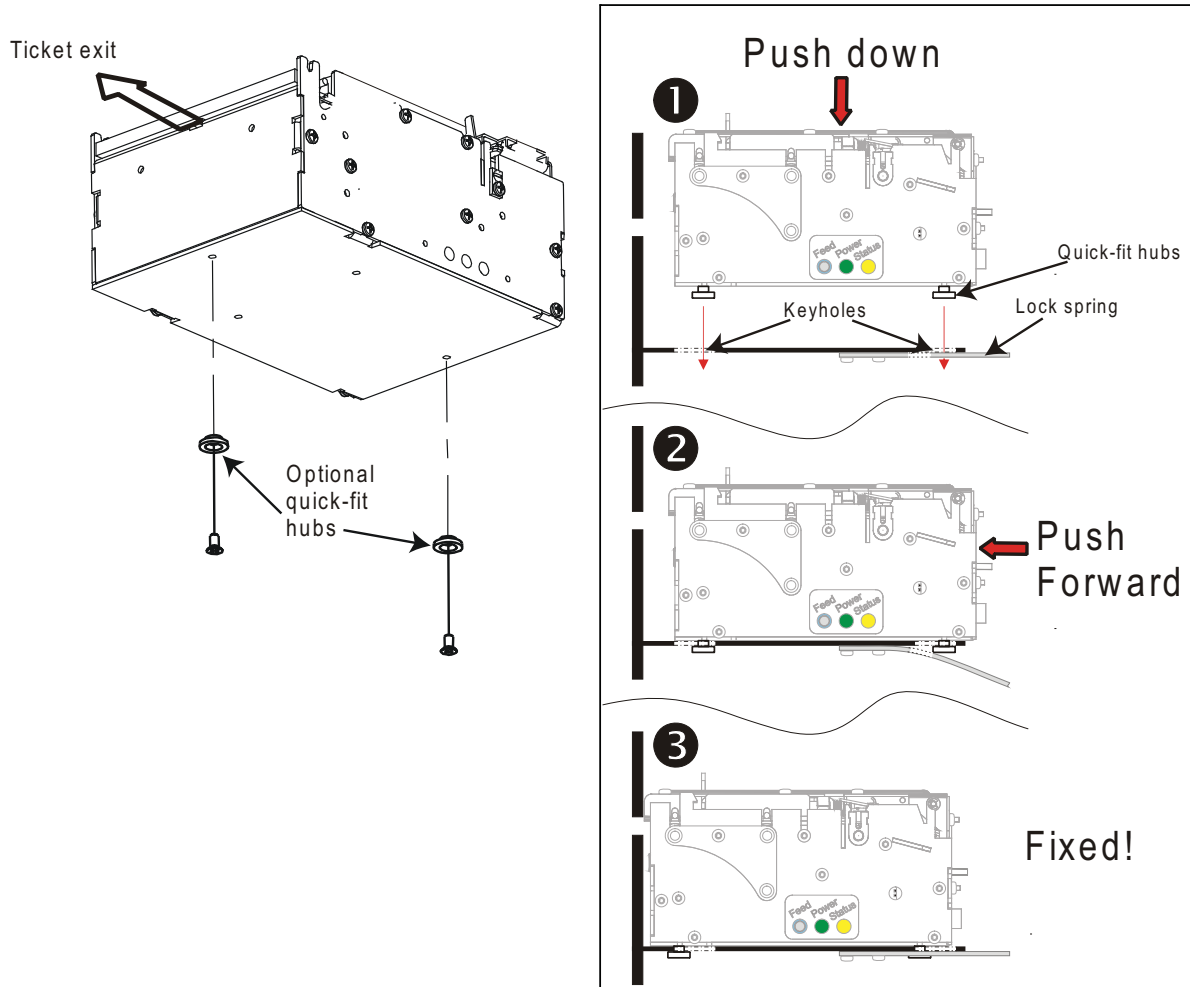


Quick-Fit Hubs

The printers attach to the kiosk in two ways:

- using two screws
- using slides with leaf spring retainers and the quick-fit hubs.

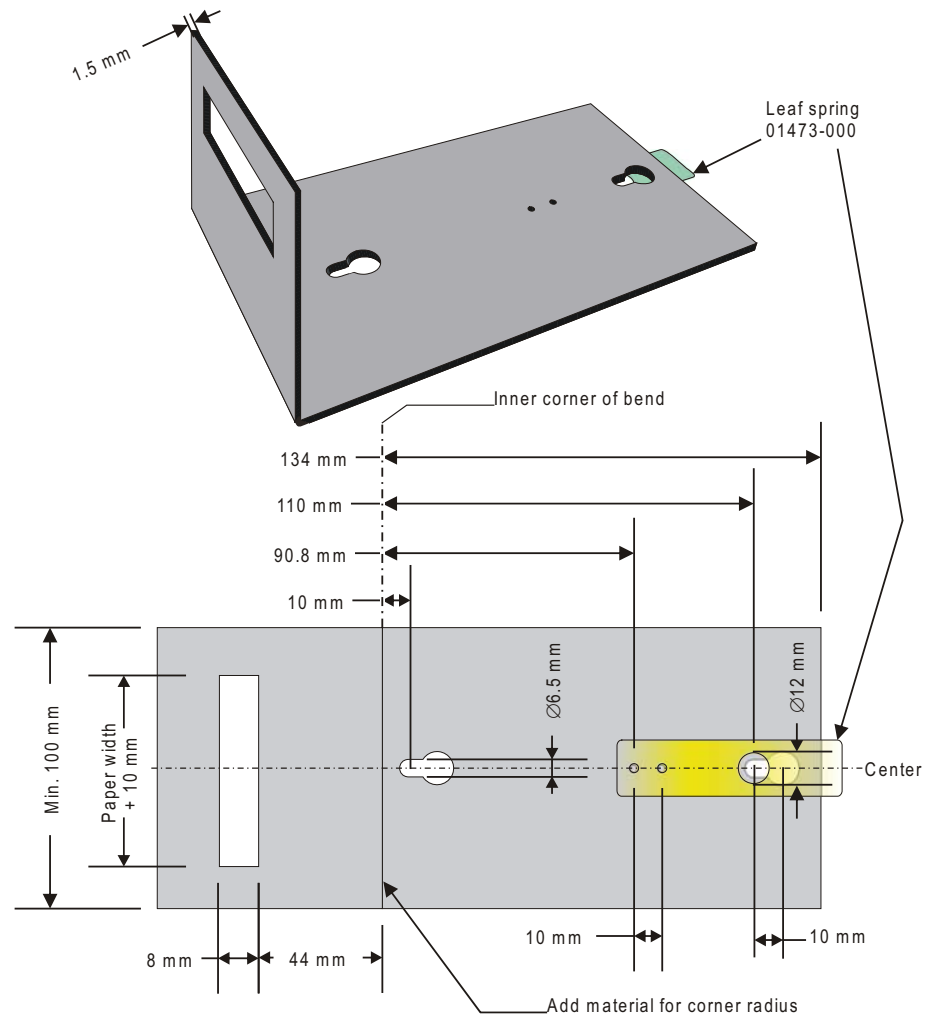
Figure 6 • Front, Bottom View



Design Your Own Mounting

The illustration below gives an example of a printer-mounting shelf. See *Dimensions on page 120*, and the 3D solid models and outline drawings for CAD that are available on <http://www.zebra.com>.

Figure 7 • Example of a Simple Shelf for Fastening a Standard Printer Using Quick-Fit Hubs and a Leaf Spring Retainer (Order No. 01473-000)



Additional space is required for paper loading and paper jam removal. Consider mounting the printer on a movable platform so that the printer can be maintained outside the printer enclosure.



Note • We recommend you to make the output slot 97 mm wide. This way you will be able to use all paper widths that the TTP 2100 series of printers can handle.

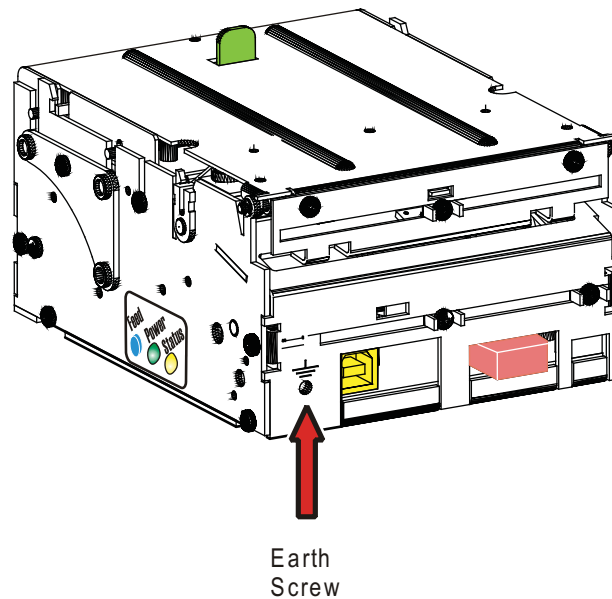


Caution • NEVER use screws that go into the printer more than 4 mm! This will destroy the electronics inside.

Electrostatic Discharges and Earth Currents

Preventing ESD and earth currents from affecting the printer operation requires proper connection of the printer chassis to protective earth through a mounting platform or through a separate earth conductor. A threaded hole for an M4 earth screw is provided on the back of the printer. Use an M4 x 10 screw and two lock washers when fastening the ground cable.

Figure 8 • Location of Earth Grounding Screw



Note • An optional antistatic brush can be fitted to the front of the printer if required.

Ambient Light

There is an optical sensor at the paper exit at the front of the printer.

To ensure proper printer operation, design the kiosk so that it prevents direct sunlight or light from indoor lamps from reaching the sensor through the paper exit.

Installing a Paper-low Sensor (Optional)

A paper-low sensor alerts the system that the media stock level is running low. The paper-low sensor works with paper rolls and fanfold media. The purpose of this sensor is to get an early alert so that you can replace the ticket stock in time in remotely located kiosks.

Roll holders supplied by Zebra can be equipped with paper-low sensors. Attach the sensor and connect the cable to the paper low connector at the back of the printer.

Figure 9 • Paper-low Sensor Connection

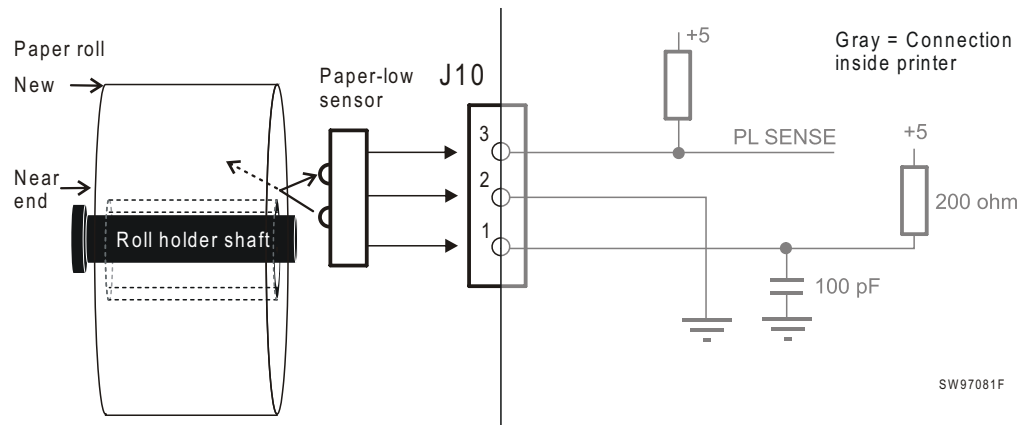
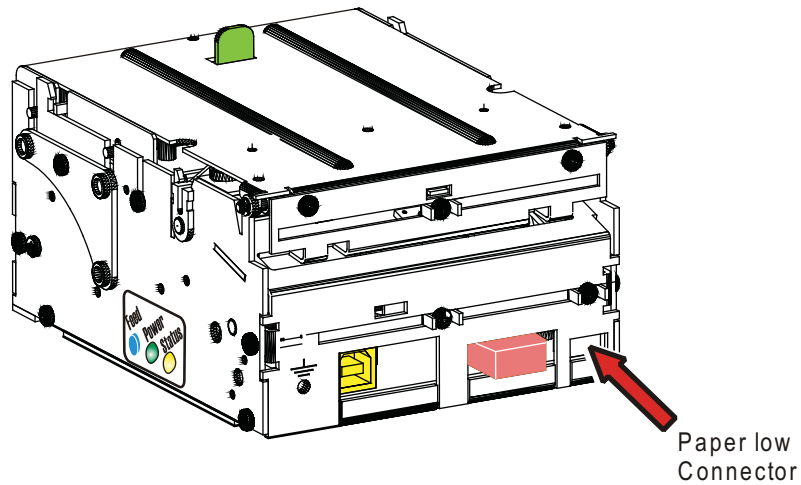
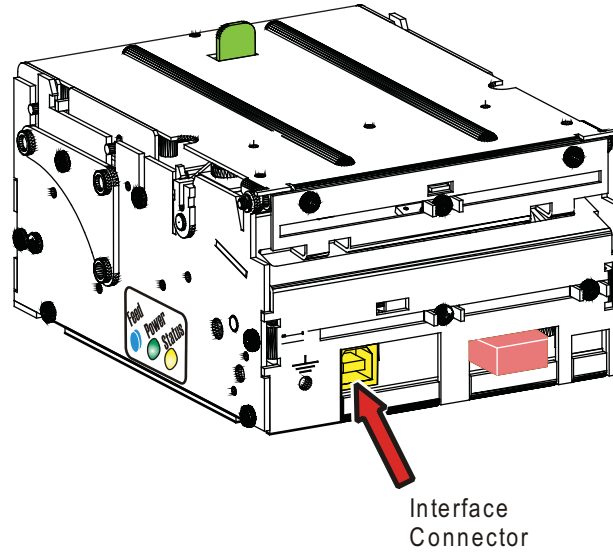


Figure 10 • Location of Paper-low Connector



Connecting to the Computer

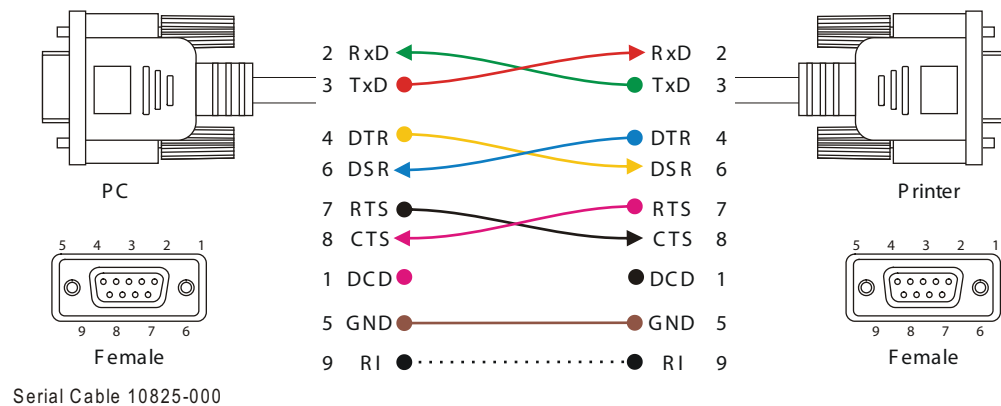
Figure 11 • Location of Interface Connector



TTP 2110

Connect a Zebra serial cable, ordering No. 10825-000, between the printer and the computer to be used. We strongly recommend using the Zebra cable because many incompatible cables are available, which may cause communication problems.

Figure 12 • Serial Interface Cable 10825-000.



Dotted leads are not connected in the printer. To be able to connect the cable in any direction, make symmetrical cables.

TTP 2130

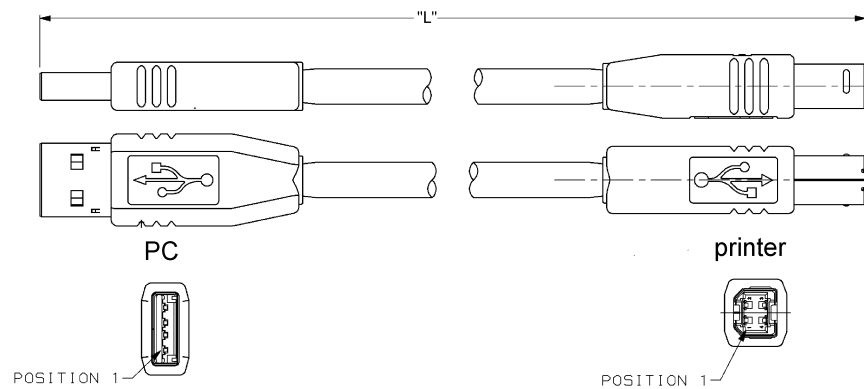
Connect the printer to the USB port of the computer or the USB hub to be used. USB connectors can be recognized by the following symbol:



The connector on the printer is a 4-pin USB type B connector. See [Table 4, USB Connector \(J13\) Pin Assignment on page 105](#) for pin assignment.

A suitable cable is available from Zebra, part number 105850-028.

Figure 13 • USB Cable with Type A and Type B Connectors



SW98041

Connecting the Power



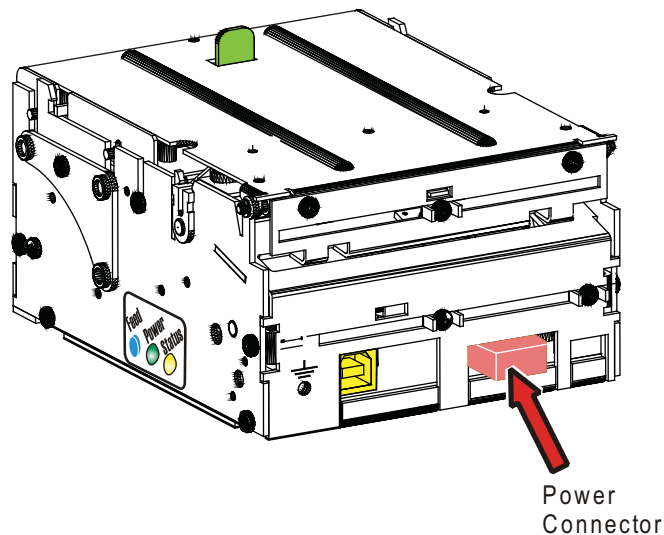
Caution • Using a non-Zebra power supply may cause excessive EMC interferences and void the EMC certifications of the printer.



Caution • To avoid electrical shock and printer damage, wiring of a non-Zebra power supply should only be done by qualified service personnel. Use **ONLY** a power supply which meets the following minimum requirements:

- 24 VDC $\pm 5\%$
- 70W average (2.92A) and 284W peak (11.8A) power supply

Figure 14 • Location of Power Connector



Caution • On power supplies with line voltage selector, make sure it is set to your local line voltage.

Using the appropriate Zebra power supply for TTP 2100 Desktop, or Embedded (70W Power Supply [on page 122](#)):

1. Connect the cable from the power supply the power connector on the back of the printer.
2. Connect the power cable to the line outlet.
3. Turn ON the power.

In kiosk applications you may draw power from a common PSU in the kiosk if the characteristics are suitable. In such a case, cables that fit the connector on the back of the TTP 2100 are available from Zebra. If you make cables of your own, connect the voltages according to the following illustration.



Note • Protective ground and minus output should *not* be interconnected in the power supply.

At the printer end of the cable, use a Tyco Mate-N-Lok connector housing and two contact-sockets.

Figure 15 • Power Connection

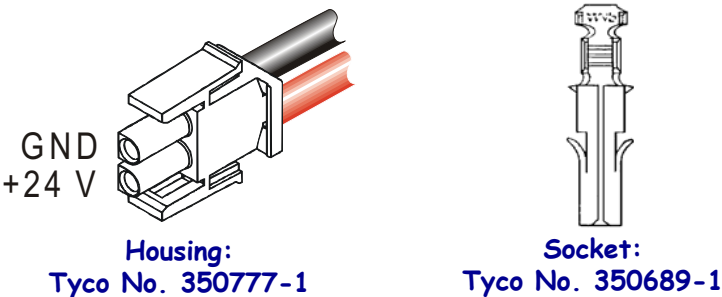


Table 2 • Current Consumption

Mode	58-60 mm paper width	80 – 82.5 mmpaper width
Idle	150 mA	150 mA
Standard text printing	0.7 A average	1 A average
All black printing	4 A	6 A

Making a Self-Test Printout

A Self-Test Printout provides a printout showing information specific to the printer, including:

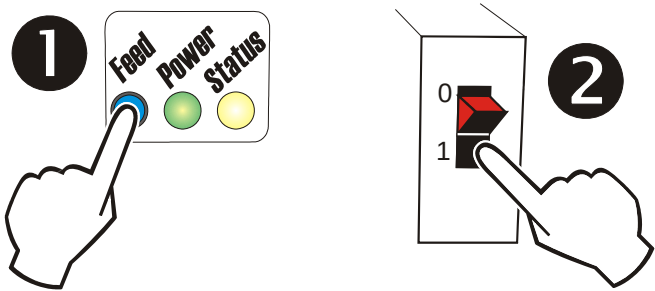
- Firmware version
- Control board (PCA) revision
- Paper width
- Serial number
- Installed fonts and logotypes
- Parameter settings
- Barcode support

To make a Self-Test Printout:

1. Enter Self-Test Mode using one of the following methods:

If...	Then...
the printer has firmware version 3.83 or higher	Press and hold the Feed button for 3 seconds.
the printer has firmware lower than version 3.83	a. Press and hold the Feed button just after closing the print head. b. See Figure 16. Press and hold the Feed button (1) while turning on the power (2) to the printer. c. Hold down the Feed button until printing starts. Each successive time the Feed button is pressed will produce an additional Self-Test printout until Self-Test Mode is exited. d. Exit Self-Test Mode by power cycling the printer (turning the power off then on again). If the power switch is not easily accessible, open and close the print head.

Figure 16 • Locate the Feed Button and On/Off Switch

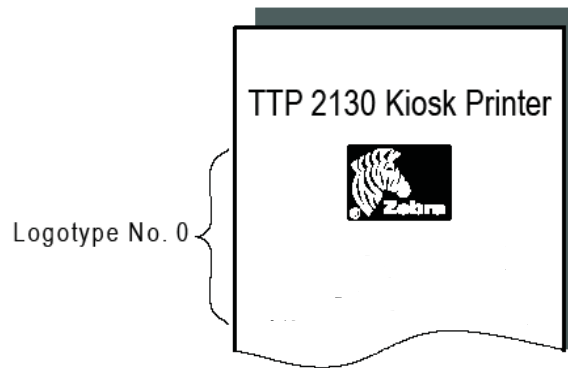


Customizing the Self-Test Printout

The self test printout starts with a text line, and then a Zebra logotype. This logotype is just a printout of logotype No. 0, so if you want to personalize the self test printouts in your installation, delete all logotypes and store your own logotype as No. 0.

See also *Logotypes* [on page 78](#).

Figure 17 • Logotype No. 0 is Printed on the Self-Test Printout



Installing a Printer Driver

A printer driver for Microsoft Windows™ is available on the Zebra web site <http://www.zebra.com>. Please follow the installation instructions that accompany the drivers and refer to the Kiosk Driver Reference Guide, Part Number P1006873-001, available on www.zebra.com for detailed driver information.

Operation



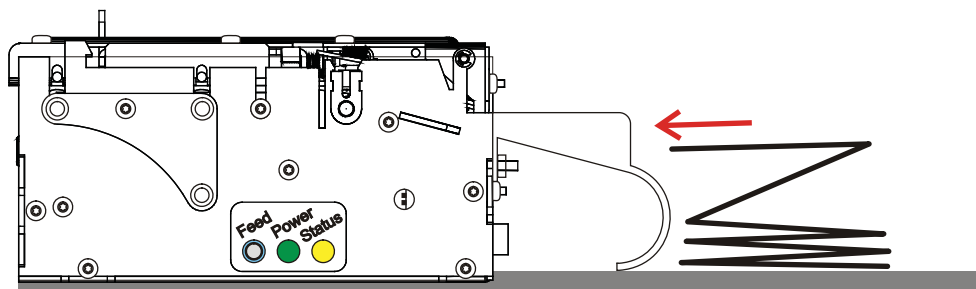
Loading Fanfold Ticket Stock

1. Turn the tickets so that the surface to be printed (temperature sensitive side) faces upwards. Put the first ticket on the input guide and slide it up the guide into the printer.
2. The printer will feed the paper, locate the edge and reverse to printing position.
3. When ready, the yellow status led will be ON indicating that the printer is ready to be used.



Note • Remember that the thermal coating should be upwards and black-marks (if used) should face down. The printer will automatically load the tickets when the sensors detect a ticket is loaded.

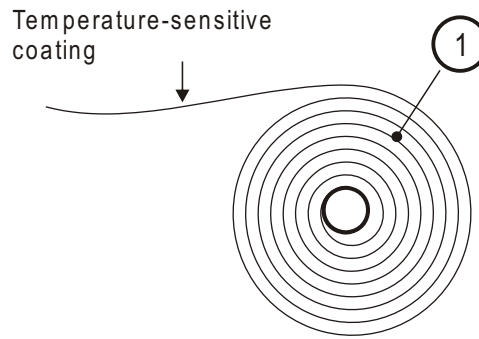
Figure 18 • Loading Ticket Stock



Installing a Paper Roll

1. Turn the new paper roll as shown. The paper should be inserted into the printer with the temperature-sensitive side up so that the paper leaves the roll from the top.

Figure 19 • Installing a Paper Roll



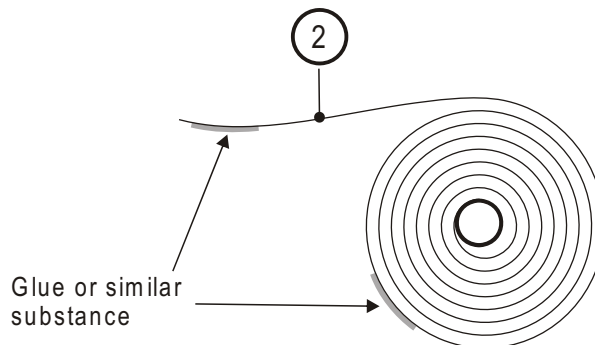
SW96074C

2. Tear off a full turn of the paper from the new paper roll.



Caution • This is important since the outer end of the paper is usually fixed to the roll with some type of glue or self-adhesive substance that might otherwise cause paper jam or even printhead damage.

Figure 20 • Remove Outer Layer of Paper Roll



SW96075C

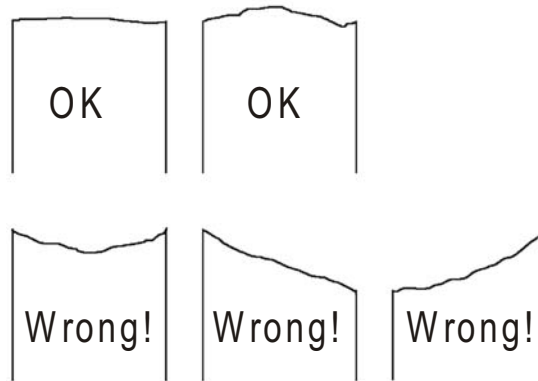
3. Make sure the printer is turned ON.
4. Insert the ticket stock through the paper entry opening at the back of the printer.



Note • The ticket sensor is at the center of the print width. If the ticket edge is torn off in such a way that the sensor does not see it, auto load will not be triggered. If so, reshape the edge so that the sensor sees the ticket stock.

5. Press the Feed button so that the printer feeds, cuts, and ejects a page. This ensures that the first ticket printed will have a straight edge.

Figure 21 • Example of Bad Page Edges

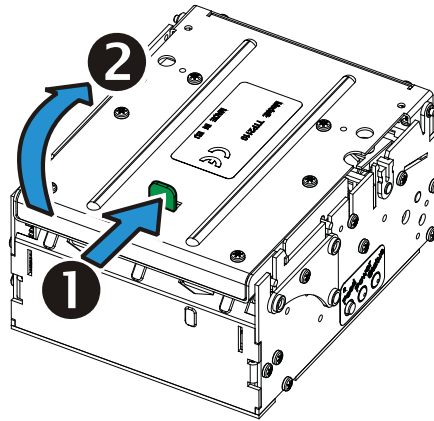


Clearing Paper Jams

Should a paper jam occur, follow the procedure below:

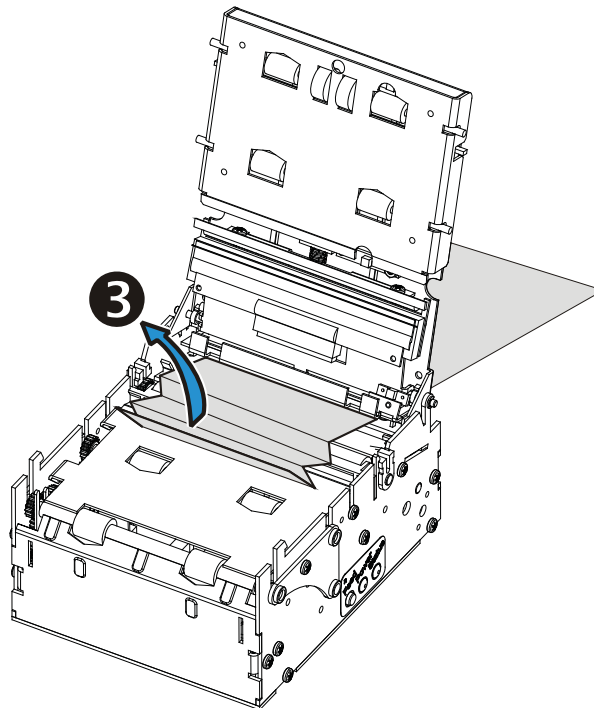
1. Open the printer lid.
 - a. Press the green release lever toward the rear of the printer.
 - b. Lift the lid.

Figure 22 • Opening the Lid



2. Remove all jammed paper, make sure the paper path is clear, and close the lid.

Figure 23 • Remove Paper Trash





Programming

There are two ways of generating a printout with the TTP 2100 printer: using the KPL control language or using a printer driver.

KPL Control Language	When operating in this mode, you have direct control over what the printer does using KPL command sequences. The printer has two operation modes you can choose from. In variable page mode, the printer can act as a simple word processor, printing text that it receives. It can also print some types of bar codes and basic graphics in this mode. The selection of fonts and bar code types that are available are limited to what is stored in the flash PROM and the firmware of the printer. In this mode, information is printed in the same sequence as it is received. In fixed page mode, you can place rotated text, bar codes, images, and ruled lines. This mode provides more flexibility than variable page mode, but is limited by available printer memory. Printout elements can be specified in any order. You instruct the printer when your layout is complete, and it is all printed at once. Selection of the mode is controlled by the setting of parameter n36. (Refer to <i>Document Mode</i> on page 88 for more information about parameter n36) Use the Zebra Toolbox (available from http://www.zebra.com) to easily build text oriented designs.
Printer Driver	TTP 2130 printers can print documents through a driver. When a Windows driver is used, you can use any Windows program to design the ticket with text, graphics, bar codes or whatever you want to print and in any orientation. When using a driver, printout is not limited by printer memory. The Windows driver issues all the necessary commands. By setting up printing preferences in the driver you select how the printer should cut and present the printout.

Figure 24 • Printout Styles

KPL Control Language receipt



Driver (Windows) receipt



- Bar codes can be added.

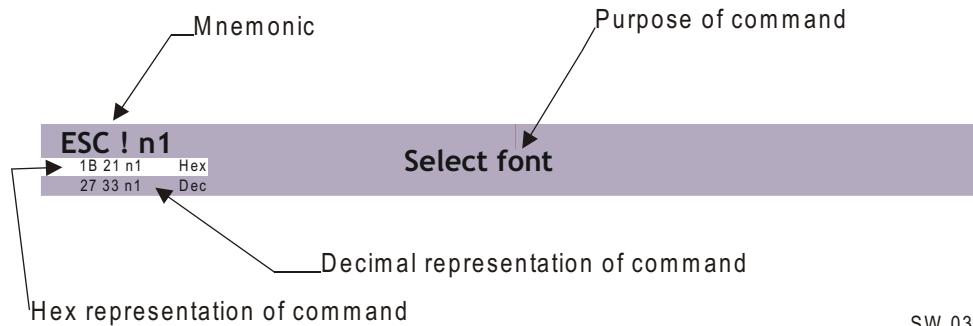
- ✓ Text can be printed in any orientation, font, and size.

➤ Lines can be added.

Graphics can be rotated,
color images converted
to gray scale, etc.

Sw98073

How the Commands are Described



SW 03002

Mnemonic

Is the popular command name that should be easy to remember.

Hex

Give the command in hex representation

Decimal

Give the command in decimal representation

Values

n1, n2, etc. represent values that you specify to control how the command behaves. These are different for each command and are explained in the text that follows each command description.

Examples

Command examples are formatted in Courier and typed in the same way as used in the Zebra Toolbox:

```
<ESC>&P<1><19>
```

Where <ESC> means the escape character 27 decimal (hexadecimal 1B). Numbers between less-than and greater-than characters, for example <1><19>, means 1 and 19 decimal. When the numbers indicate a hex value, h is appended to the number (<h 01><h 13>).



Example • <065>, <h 41> and A are three different ways of expressing the character A.

Two-Byte Character Definitions

Some commands and parameters are used with a two-byte value definition because the internal structure of the printer's firmware limits access to values greater than 255.

To represent values greater than 255 in this two-byte format, divide the value by 256. The whole number (quotient) is the value of the leading byte and the remainder (modulo) is the value of the trailing byte.



Example • To represent 731 in two-byte notation, divide 731 by 256.

$731 \div 256 = 2$ with a remainder of 219 ($2 \times 256 + 219 = 731$)

Therefore, the two-byte representation of 731 is <2><219>.

Summary of Control Codes and Escape Sequences

Command	Hex	Decimal	Function	Page
BS	08	8	Backspace	48
CAN	18	24	Cancel	48
CR	0D	13	Carriage Return	49
EM n1	19 n1	25 n1	Enforced Clear Presenter	61
ENQ	05	5	Clear Presenter	62
ESC ACK n1	1B 06 n1	27 6 n1	Acknowledge Marker	75
ESC n1	1B 7C n1...nx	27 124 n1...nx	Bar Code Print	54
ESC ! n1	1B 21 n1	27 33 n1	Select Font	45
ESC #	1B 23	27 35	Calibrate TOF Sensor	43
ESC & 000	1B 26 00	27 38 0	Load Font	64
ESC & 001	1B 26 01	27 38 1	Load Logotype	63
ESC & 004	1B 26 04	27 38 4	Store Current Parameter Values	63
ESC & C	1B 26 43	27 38 67	Erase All Fonts	64
ESC & D	1B 26 44	27 38 68	Erase Fonts 4 to 7	64
ESC & F	1B 26 46	27 38 70	Recall Parameter Profile	64
ESC & L	1B 26 4C	27 38 76	Erase All Logotypes	63
ESC & P n1...n2	1B 26 50 n1...n2	27 38 80 n1...n2	Set Parameter Value	65
ESC & s n1	1B 26 73	27 38 115	Load SPI Slave Firmware	65
ESC ?	1B 3F	27 63	Reset (Full)	63
ESC @	1B 40	27 64	Reset (Initialize)	63
ESC b n1...n5	1B 62 n1...n5	27 98 n1...n5	Print Bitmap at XY-Position	55
ESC B n1	1B 42 n1	27 66 n1	Bold	45
ESC B C	1B 42 43 n1	27 66 67 n1	Bar Code Clear	53
ESC B S n1...n11	1B 42 53 n1...n11	27 66 83 n1...n11	Bar Code Field Specify	52
ESC BW n1 nx	1B 42 57 n1	27 66 87 n1	Bar Code Write	53
ESC d n1	1B 64 n1	27 100 n1	Make n Linefeeds	49
ESC ENQ 001	1B 05 01	27 5 1	Status Enquiry	67
ESC ENQ 002	1B 05 02	27 5 2	Paper-Near-End Enquiry	68
ESC ENQ 004	1B 05 04	27 5 4	Fonts and Logotype Enquiry	69
ESC ENQ 005	1B 05 05	27 5 5	Sensor Enquiry	70
ESC ENQ 006	1B 05 06	27 5 6	Status Report	71
ESC ENQ 007	1B 05 07	27 5 7	Firmware-Version Enquiry	72
ESC ENQ 009	1B 05 09	27 5 9	Serial-Number Enquiry	72
ESC ENQ 010	1B 05 0A	27 5 10	Control Board Revision Enquiry	72
ESC ENQ 011	1B 05 0B	27 5 11	Head Temperature Enquiry	73

Command	Hex	Decimal	Function	Page
ESC ENQ 012	1B 05 0C	27 5 12	Bootware Version Enquiry	73
ESC ENQ c	1B 05 63	27 5 99	Device ID Enquiry	73
ESC ENQ E	1B 05 45	27 5 69	Read Extended Status	74
ESC ENQ P n1	1B 05 50 n1	27 5 80 n1	Parameter-Setting Data Enquiry	75
ESC FF n1	1B 0C n1	27 12 n1	Eject (Run Presenter)	61
ESC g n1...n5	1B 67 n1...n5	27 103 n1...n5	Print Logotype	57
ESC h n1	1B 68 n1	27 104 n1	Text Height	47
ESC i n1	1B 69 n1	27 105 n1	Italics	46
ESC j n1	1B 6A n1	27 106 n1	Paper Reverse	59
ESC J n1	1B 4A n1	27 74 n1	Paper Advance	58
ESC L n1	1B 4C n1	27 76 n1	Print Logotype at Current Position	57
ESC N n1	1B 4E n1	27 78 n1	Align Text	44
ESC NUL	1B 00	27 0	Load Firmware	66
ESC o n1	1B 6F n1	27 111 n1	Text and Logotype Orientation	44
ESC p	1B 70	27 112	Print	58
ESC P n1	1B 50 n1	27 80 n1	Print Self-Test Printout	58
ESC Q n1 n2	1B 51 n1...n2	27 81 n1...n2	Quick Advance	59
ESC r n1...n9	1B 72 n1...n9	27 114 n1...n9	Print Ruler Line	56
ESC RS	1B 1E	27 30	Cut Only, No Eject	60
ESC s n1	1B 73 n1	27 115 n1	Send Dot-Line, 203 dpi	55
ESC t n1...n5	1B 74 n1...n5	27 116 n1...n5	Print Text at XY	48
ESC T n1	1B 54 n1	27 84 n1	Reversed/Inversed Text	46
ESC u n1	1B 75 n1	27 117 n1	Underline	46
ESC w n1	1B 77 n1	27 119 n1	Text Width	47
ESC Z	1B 5A	27 90	Go to Next Top of Form	43
FF	0C	12	Form Feed	50
HT	09	9	Horizontal Tabulation	50
LF	0A	10	Linefeed	49
RS	1E	30	Cut and Eject	60
US	1F	031	Partial Cut (Unit Separate)	61



Note • In all responses from the printer the most significant byte (MSB) is transmitted first.

Software Command Syntax

The commands in this section are grouped after what they do, and these groups are sorted in a theoretical usage sequence. It starts with commands for specifying the printed page—through text-and-graphics commands—to cut-and-present commands. System and status commands are presented at the end.

Black-Mark (Top-of-Form) Commands

See also *Aligning Preprint and Thermal Print* on page 99.

ESC

1B 23	Hex
27 35	Decimal

Calibrate TOF Sensor

When the printer is not in black mark mode, the calibration measures the out of paper level (parameter 58) and the whiteness of the paper.

In Black Mark Mode, it also determines if it should trigger on black marks or holes, then measures the contrast of the mark and distance between marks, then sets parameters n37-n40, n51, n57 bit 3, and n58 to suitable values for the analyzed ticket.

To make the calibration permanent, send <ESC>&<4> to store parameter values.



Note • If black mark calibrations fails, the printer will indicate error code 11 by blinking 11 times when you press and hold the Feed button, and by answering NAK 11 to the status enquiry.

ESC Z

1B 5A	Hex
27 90	Decimal

Go to Next Top of Form

In black mark mode, an ESC Z starts looking for a black mark at the current position and continues for one page length. If no black mark is found, bit 3 in status byte 1 is set to 1 and the printer will report NAK 0A on the next status query.

When black-mark mode is disabled, ESC Z will perform a form feed.

Text Commands

Text received by the printer is printed with the currently selected font and font attributes. Text exceeding the page width is wrapped with the line spacing selected.

ESC o n1

1B 6F n1 hex
27 111 n1 decimal

Text and Logotype Orientation

Changes the orientation of text and logotypes.

n1 = 0	Gives portrait orientation
n1 = 1	Gives landscape orientation
n1 = 2	Gives upside down portrait orientation
n1 = 3	Gives upside down landscape orientation

Portrait and landscape or upside-down portrait and upside-down landscape can be mixed on the same printout. There are two cursors, one for portrait and one for landscape. The cursor always starts at the top left corner of the document. Looking at the paper when it exits the printer, the portrait cursor is at the top left corner of the printout, moving to the right as text is typed, while the landscape cursor is at the top right corner, moving downwards.



Note • The upside-down orientations (n1 = 2 and n1 = 3) were introduced in firmware version 3.27g. They can only be used with Fixed Document mode.

ESC N n1

1B 4E n1 hex
27 78 n1 decimal

Align Text

Changes the alignment of text and logotypes printed with ESC L on the current line; on subsequent lines, it defaults back to Left align. The alignment can be changed multiple times per text line.

n1 = 0	Left
n1 = 1	Center
n1 = 2	Right

ESC ! n1

1B 21 n1 hex
27 33 n1 decimal

Select Font

This command selects one of the printer's eight installed fonts. The font design depends on which fonts have been loaded into the printer's flash PROM. Make a test printout to see which fonts are available in your printer.

n1 = 0	Normal font (font 0)
n1 = 1	Font 1
n1 = 2	Font 2
n1 = 3	Font 3
n1 = 4	Font 4
n1 = 5	Font 5
n1 = 6	Font 6
n1 = 7	Font 7



Note • For information on loading fonts, see *Font Loading* on page 76.

This command performs the same function as setting parameter n14, Font Selection. Refer to *Font Selection* on page 87 for more information.

If a line of text is too long to be printed due to the font, position, print width, or any other factor, the text line will be automatically wrapped. If the wrapping occurs, any alignment command is canceled. Different fonts can be used on the same line.

Selecting an empty font location will set bit 4 of byte 1 in the ENQ 6 response to 1. The printer will also return a NAK 12 on the next ENQ 1 enquiry. This NAK 12 is a one-time error that will clear after read.



Note • If more than 379 characters are sent to the printer before an LF, the text buffer is printed automatically. Each font or text style change consumes two bytes in this buffer. The text is formatted based on the formatting commands as they were received.

ESC B n1

1B 42 n1 Hex
27 66 n1 decimal

Bold

Bold command works best with normal character width. With higher widths, the effect of bold becomes less pronounced. The Bold command can be applied to single characters, words, or text lines.

Bold remains in effect until deactivated or until the printer is reset.

n1 = 0	Turns OFF bold (Normal)
n1 = 1	Turns ON bold

ESC i n1

1B 69 n1 Hex
27 105 n1 decimal

Italics

The Italics command works best with normal character width and height. At other values, the output can become pixelated. The Italics command can be applied to single characters, words, or text lines.

Italics remains in effect until deactivated or until the printer is reset.

n1 = 0	Turns OFF Italics (Normal)
n1 = 1	Turns ON <i>Italics</i>

ESC T n1

1B 54 n1 Hex
27 84 n1 decimal

Reverse Text and Background

Selects normal black text on a white background or reversed white text on a black background. Single characters, words, or complete text can be reversed.

This command remains in effect until deactivated or until the printer is reset.

n1 = 0	Gives normal print, black on white
n1 = 1	Gives reversed print, white on black



Note • Reverse text and underline invert the print data. This means that the order in which the commands are issued affect the printout if the text overlaps, such as in the case of italics.

ESC u n1

1B 75 n1 hex
27 117 n1 decimal

Underline

n1 = 0	Turns OFF underline
n1 = 1..7	Turns ON a 1–7 pixel thick underline

Characters, single words, or complete text lines can be underlined.

ESC h n1

1B 68 n1 hex
27 104 n1 decimal

Text Height

This command scales the height of the text printed by a factor of up to 16x. The valid range of values is 0 to 15.

n1 = 0	Resets the character height to the base character height
n1 = 1...15	Increases the character height to 2...16 times the base character height.

In combination with variable character width (ESC w n1), give highly legible characters depending on the font to which the command has been applied.

Different heights can be mixed on the same print line.

ESC w n1

1B 77 n1 hex
27 119 n1 decimal

Text Width

This command scales the width of the text printed by a factor of up to 8x. The valid range of values is 0 to 7.

n1 = 0	Resets the character width to the base character width
n1 = 1...7	Increases the character width to 2...8 times the base character width.

In combination with variable character height (ESC h n1), give highly legible characters depending on the font to which the command has been applied.

Different widths can be mixed on the same print line.



Important • Use of the multiple width function when printing bar codes is not recommended as the text data may become illegible.

ESC t n1...n5	data		Print Text at XY
1B 74 n1...n5	data	hex	
27 116 n1...n5	data	decimal	

Prints a text string at the specified XY position. The string is formatted based on the current active formatting attributes except for alignment.

n1n2	Two byte definition of the X print position (in pixels).
n3n4	Two byte definition of the Y print position (in pixels).
n5	The number of characters in the string. To avoid having to count characters you can set n5 to 00h (null) and then terminate the text string with null.
data	The text string. If text string length is specified with n5, the length must be exactly the number of characters specified, otherwise the printer will stop, waiting for more characters. Data that extends off the edge of the printable area will not be wrapped to the next line.

After the data has been printed, the cursor will return to the position it had before the print text.



Note • The Y coordinate will be ignored if the printer is in variable document mode (n36=1).



Note • ESC t clears the text buffer each time it is used, destroying any unprinted text on the same line. Commands will not be cleared.

BS	Backspace	
08	Hex	
8	Decimal	

Moves the print-position one step to the left. Backspace can be used to combine characters. For instance to print a Ø, send text commands O BS / to the printer, and the slash will overprint the O.

The print position can only be moved one step to the left. Multiple backspaces in succession are ignored.

CAN	Cancel	
18	hex	
24	decimal	

Cancels text and attributes sent before the CAN command on the same line.

Commands are not cancelled.

CR

0D	hex
13	decimal

Carriage Return

By default, carriage return is ignored.

Parameter n33 (CR/LF Behavior) can be changed so the printer interprets CR as follows:

- Interpret it as CR, returning the print position to beginning of line without line feed.
- Interpret CR as CR/LF, inserting line space as specified by the line spacing setting (see parameter n13), and returning the print position to beginning of the line.

See *CR/LF Behavior* on page 87.

LF

0A	hex
10	decimal

Linefeed

Linefeed is interpreted as CR/LF by default. This inserts line spacing as specified by the line spacing setting (see parameter n13), and returns the print position to beginning of the line. LF also converts text from the text buffer to pixel lines and stores them in the line buffer, ready to be printed.

By changing the default settings, you can:

- Interpret LF as Linefeed. This inserts line space as specified by the line spacing setting (see parameter n13), without returning the print position to the beginning of the line.
- Ignore LF.

See *CR/LF Behavior* on page 87.

ESC d n1

1B 64 n1	hex
27 100 n1	decimal

Make n Linefeeds

Executes the number of linefeeds as defined by variable n1. The length of each line feed is determined by the default value for selected font or the line spacing setting specified by n13, whichever is greater (refer to parameter *Line Spacing* on page 87).

If an LF has not yet been sent to convert the text buffer to the line buffer, the lines printed by ESC d are copies of that line. Following this, the print position is returned to the beginning of the line.

FF

0C	hex
12	decimal

Form Feed

Prints data from the text buffer and feeds the paper to the top of the next page.

In fixed document length mode (n36 = 0) this command prints data in the text buffer and feeds the paper to the top of next page.

In variable document length mode, FF advances to the minimum page length as specified by n37 and n38. If the printout already is longer than the minimum page length, FF does not feed any additional paper.

In black-mark mode, the FF command looks for a black mark, see ESC Z.

If Auto Cut (n34) is set to 1 (see *Auto Cut After FF* on page 88), FF effects form-feed, cut, and eject.



Note • Use parameter p37 and p38 to define page length.

HT

09	hex
9	decimal

Horizontal Tabulation

Shifts the current print position to the next Tab position

Set tab positions with parameters n15 – n30. Refer to *Tab Stop* on page 87

Bar Code Commands

TTP 2100 can print EAN 8, EAN 13, EAN128, UPC, 2-of-5 Interleaved, ISBN, Code39 and Code128 bar codes with its standard firmware. A special firmware is available where the bar codes are replaced with the PDF 417 2D bar code. See *Firmware* on [page 110](#) and *Bar Code Print (PDF 417)* on [page 54](#).

Figure 25 • Samples of Bar Codes



Example • This example will print an EAN bar code with height = 10 mm, 15 mm in from the left margin.

```
<ESC>BS<0><0><h 48><0><0>
<00><0><h 40><0><2><2>
<ESC>BW<00>733104000099<00>
<LF><RS>
```

ESC B S n1...n11

1B 42 53 n1...n11 hex
27 66 83 n1...n11 decimal

Bar Code Field Specify

Bar codes can only be printed in portrait mode unless Fixed Document Mode is selected. See *Document Mode* [on page 88](#)

n1	Specifies the bar code field number. The valid range is 0 – 15. Bar code fields may be specified in any order.
n2n3	Specifies the X coordinate of the bar code field origin (n2 is the higher order byte and n3 the low order byte). n2 and n3 are one-byte numbers. Refer to <i>Two-Byte Character Definitions</i> on page 40 for more information about two-byte values. Values that place the bar code outside the printable area may cause the bar code to be partially printed and be unreadable.
n4n5	Specifies the Y coordinate of the bar code field origin (n4 is the high order byte and n5 is the low order byte). n4 and n5 are one-byte numbers. Refer to <i>Two-Byte Character Definitions</i> on page 40 for more information about two-byte values. Values that place the bar code outside the printable area may cause the bar code to be partially printed and be unreadable.
n6	Must be specified but is not used.
n7n8	Specifies the height of the bars in pixels (n7 is the high order byte and n8 is the low order byte).
n9	Specifies the type of bar code. The following types are supported.
n9 = 0	EAN 8 or 13 (auto detect). The printer calculates the necessary check digit.
n9 = 1	UPC
b9 = 2	2/5 Interleaved (even number of characters must be sent)
n9 = 3	ISBN
n9 = 4	Code128 (Start data string with C2h to encode EAN128)
n9 = 6	Code39
n10	Specifies the thickness of the narrow bar 0=1 pixel, 1=2 pixel, and so on.
n11	Specifies the wide-bar-to-narrow-bar ratio. Only used in Code 39 and 2-of-5 interleaved where different ratios are allowed

This command reserves an information field as a bar code field. The command also identifies the type, number of digits, and the configuration of bars to be placed in the bar code field.

Code 128 / EAN128

The following codes select function codes in Code 128:

Name	Dec	Hex
FNC1	193	C1h
FNC2	194	C2h
FNC3	195	C3h
FNC4	196	C4h

Starting the data string with FNC1 generates an EAN128 code.



Note • By default, the printer will print bar codes with human readable characters. To avoid this behavior, load the font 1x1 .swf to the PROM and select that font with ESC ! before you specify the bar code. After the ESC BW command, you can return to the normal font. This font is available in the Toolbox application.

ESC BW n1 nx

1B	42 57	n1	nx	Hex
027	066 087	n1	nx	Decimal

Bar Code Write

Writes data to the bar code field reserved by the ESC BS command.

n1	Specifies the bar code field number. The valid range is 0 - 15. This number must be the same number used to specify the field using the ESC BS command. Fields can be specified in any order but other values than 0 to 15 are ignored.
n2 . . . nx	Specifies bar code data bytes. Up to 80 bytes may be specified. To create a bar code add-on, insert a space character and then the data for the add-on. Two of five characters are allowed of the add-on.
NUL	must be placed at the end of the bar code data.

Any invalid bar code character terminates the command, and print <Invalid bar code> on the printout.



Example • This example will print one bar code with height = 10 mm and located 15 mm to the right

```
<ESC>BS<0><0><h 48><0><0>
<00><0><h 40><0><2><02>
<ESC>BW<00>733104000099<00>
<LF><RS>
```

ESC B C

1B 42 43	n1	hex
27 66 67	n1	decimal

Bar Code Clear

Clears the bar code field reserved by command ESC BS.

n	Specifies which bar code field to clear. The range is 0 to 15. The fields may be cleared in any order.
---	--

ESC n1	nx	Bar Code Print (PDF 417)		
1B	7C	n1	nx	Hex
027	124	n1	nx	Decimal

This command positions and prints a PDF 417 2D bar code.



Note • PDF 417 requires special firmware in the printer. See *Firmware* on page 110.

n1	Specifies the type of bar code. The following types are supported:
n1 = 5	PDF417
n2n3	Specifies the X-coordinate of the bar code field origin. n2 is the most significant byte (MSB). n3 is the least significant byte (LSB).
n4n5	Specifies the Y-coordinate of the bar code field origin. The Y-coordinate is discarded in variable document mode. n4 is the most significant byte (MSB). n5 is the least significant byte. (LSB).
n6	Rows of bar code data. The valid range is 0 for automatic row calculation or 3–90 to specify the number of rows.
n7	Columns of bar code data. The valid range is 0 for automatic column calculation or 1–30 to specify the number of columns.
n8	Specifies the error correction level for the PDF417 bar code. The valid range is 0 for automatic calculation or 1–9 to specify an error level (ErrorLevel 0 to ErrorLevel 8, respectively).
n9	Specifies in pixels the height of each row of the bar code.
n10	Specifies the scaling factor of the bar code
n11n12	Specifies the length of the data to follow. Both n11 and n12 are specified as 0. The data field (n13...nx) is terminated by a null. If n11 and n12 are non-zero, they specify the length of the n13...nx data that follows. The valid range for this parameter is 0 (which species the null terminated behavior) and 1 to 2710. Even when using the null terminated behavior, you cannot specify more than 2710 bytes (not including the terminating null).
n13...nx	Byte data to be encoded. Data must be null-terminated if n11 and n12 are 0 or must be the length specified by n11 and n12 otherwise.



Example • To print Zebra as a PDF 417 bar code, send the following to the printer:

```
<ESC><124><005><000><000><000><000><000><000><003><003><000><000>Zebra<000>
```

This example will print a bar code that looks like this:



Graphics Commands

ESC b n1...n5 data

1B 62 n1...n5	Data	hex
27 98 n1...n5	Data	decimal

Print Bitmap at XY-position

Prints a black & white (1-bit color depth) Windows bitmap (BMP file) at the specified X-Y position. The bitmap must be a complete uncompressed Windows bitmap where the data starts with BM. The maximum bitmap size is limited to the free RAM printed on the self-test printout.

n1	Always 0
n2n3	Two byte definition of the X print position (in pixels).
n4n5	Two byte definition of the Y print position (in pixels).
data	Bitmap data.

After the bitmap has been printed, the cursor will return to the X-position that it had before the bitmap command was issued.

Selecting horizontal mode (with ESC ○ 0) prints the image in portrait orientation, while selecting the vertical mode (with ESC ○ 1) prints the image in landscape orientation.



Note • The Y print-position and horizontal/vertical orientation only works if Fixed Document Mode is set. See *Document Mode* [on page 88](#)

ESC s n1 data

1B 73 n1	Data	Hex
27 115 n1	Data	Decimal

Send Dot-Line, 203 dpi

Sends one line of dot data. This command is used to build images, one dot line at a time by the printer driver and should not be combined with text commands.

n1	Determines the number of bytes. Range: 1-255.
<data>	1 – x bytes, where x is the paper width in bytes. The paper width is set by parameter n48. If n48 is set to 0 (automatic width), 58 mm and 60 mm printers will use 54 bytes, while 80 mm and 82.5 mm printers use 72 bytes. The maximum width setting is 80 bytes. If you specify more bytes in n1 than the paper width of the printer, the additional bytes are discarded. If you specify less bytes in n1 than the paper width of the printer, the printer will fill the remaining portion of the dot line with blank pixels.



Caution • Always send the number of bytes that you specify with n1.

If you transmit more data than the number of bytes specified by n1, the rest of the bytes will be interpreted as text or commands. This can cause numerous problems in the printer as graphics data can contain any hex value.

ESC r n1...n9

1B 72	n1...n9	hex
27 114	n1...n9	decimal

Print Ruler Line

Prints a ruler line across the paper.

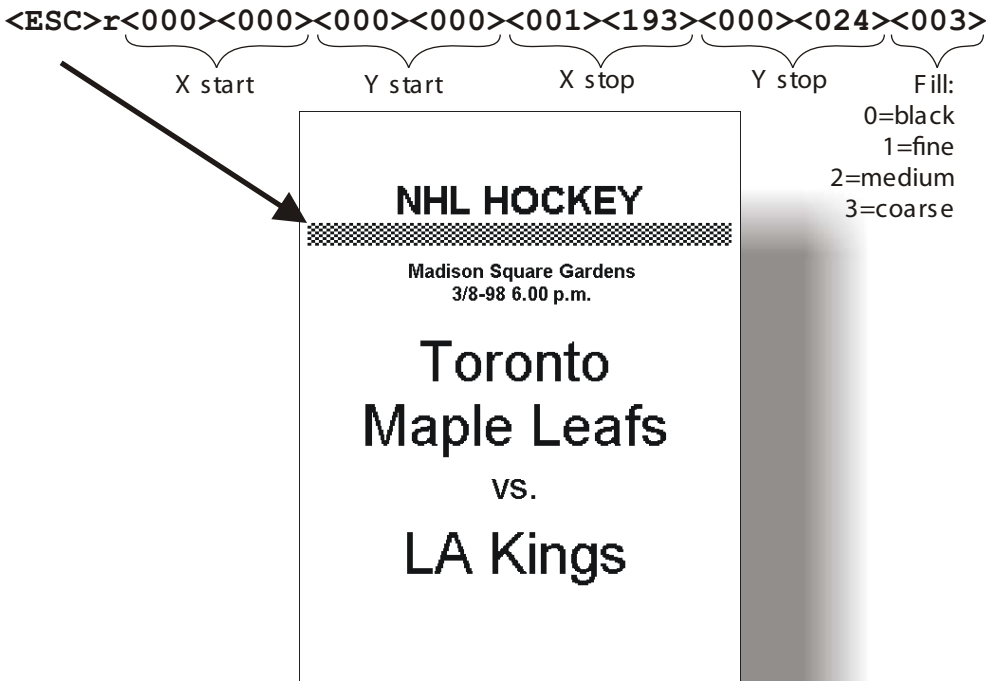
A ruler line is normally used to divide the printout into logical parts to make it easier to read. A ruler line is actually an area defined by a start X-Y position and a stop X-Y position. This area is filled with black or a checkered pattern.

n1n2	Two byte definition of the X print position to start the ruler line (in pixels)
n3n4	Two byte definition of the Y print position to start the ruler line (in pixels)
n5n6	Two byte definition of the X print position to stop the ruler line (in pixels). This value must be larger than the X start position.
n7n9	Two byte definition of the Y print position to stop the ruler line (in pixels). This value may be larger than the Y start position.
n9	Specifies the fill pattern. The valid range is 0 to 3. 0 is black and 1-3 are various checkered patterns. Values out of range are interpreted as 0.



Note • The Y print-position and horizontal/vertical orientation only works if Fixed Document Mode is set. See *Document Mode* on page 88.

Figure 26 • Printout with Checkered Ruler Line



SW99006

ESC g n1...n5

Print Logotype

1B 67 n1...n5 hex
27 103 n1...n5 decimal

Prints a customized logotype stored in the flash PROM. See also *Logotypes* [on page 78](#).

n1	One-byte logotype identification number. The valid range is 0 to 15.
n2n3	Two byte definition of the X print position to place the upper left corner of the logotype (in pixels). If the logotype extends outside the printable area, it will be clipped.
n4n5	Two byte definition of the Y print position to place the upper left corner of the logotype (in pixels). If the logotype extends outside the printable area, it will be clipped.



Note • The Y print position and horizontal/vertical orientation only works if Fixed Document Mode is set. Refer to *Document Mode* [on page 88](#) for more information.



Note • For information about logotype loading, refer to *ESC & 001* [on page 63](#).

ESC L n1

Print Logotype at Current Position

1B 4C n1 Hex
27 76 n1 Decimal

Prints a customized logotype stored in the flash PROM at the position of the cursor. The bottom edge of the logotype is positioned at the baseline of the text on the line. If the logotype is taller than the text, the line spacing is increased as necessary.

n1	One-byte logotype identification number. The valid range is 0 to 15.
----	--



Note • When using ESC L, the logotype is added to the text buffer, so a text printing command such as LF or FF must be used to generate the printout.

Print Commands

ESC p		Print
1B 70	Hex	
27 112	Decimal	

This command makes the printer print the contents of the line buffer.

Text is converted to image data in the line buffer when an LF is received. If the line buffer is empty when ESC p is received, nothing is printed.

Text to be printed\<LF><ESC>p prints "Text to be printed" on the paper.

Printout occurs automatically at:

Cut	(RS and ESC RS)
Form feed	(FF)
Clear presenter	(ENQ)
Run presenter	(ESC FF n)
Text or line buffer full	
When the FF button is pressed	

ESC P n1		Print Self-test Printout
1B 50 n1	Hex	
27 80 n1	decimal	

This command makes the printer generate a self-test page based on the current parameter settings and print that page. The parameter values printed are the ones currently being used. They can differ from Power-ON default values if for example a printout has been made by a driver before ESC P is sent to the printer.

For more information, refer to *Making a Self-Test Printout* on page 30.

n1 = 0	Gives standard self-test printout.
n1 = 1	Gives a character set printout using the font selected by parameter n14.

ESC J n1		Paper Advance
1B 4A n1	hex	
27 74 n1	decimal	

The value n1 represents the number of dot lines the paper is to be transported forwards. The valid range is 1 to 255.

A dot line is 0.125 mm, and 255 dot lines equal approximately 32 mm.



Important • Using paper feeding command (ESC J, ESC j, and ESC Q) when operating in fixed page mode (n36 = 0) causes the fixed page to be printed and then the feed operation occurs. To create white space without generating a printout of the fixed page, use LF.

ESC j n1

1B 6A n1	hex
27 106 n1	decimal

Paper Reverse

The value n1 represents the number of dot lines the paper is to be transported backwards. The valid range is 0 to 255.

A dot line is 0.125 mm, and 255 dot lines equal approximately 32 mm.



Caution • NEVER reverse more than 7 mm (n1 = 56) at top of page! The platen can lose grip on the media, which can fall out of the printer.



Important • Using paper feeding command (ESC J, ESC j, and ESC Q) when operating in fixed page mode (n36 = 0) causes the fixed page to be printed and then the feed operation occurs. To create white space without generating a printout of the fixed page, use LF.

ESC Q n1 n2

1B 51 n1	hex
1B 81 n1	Decimal

Quick Advance

The value n1 n2 represents high byte and low byte of the number of dot lines the paper is to be transported forwards. Minimum value is 1, and maximum value is 32767.

A dot line is 0.125 mm, and 32767 dot lines equals approximately 4.1 m.



Important • Using paper feeding command (ESC J, ESC j, and ESC Q) when operating in fixed page mode (n36 = 0) causes the fixed page to be printed and then the feed operation occurs. To create white space without generating a printout of the fixed page, use LF.

Cut and Present Commands



Important • The printer does not receive data while cut and present commands are executed.

RS

1E	Hex
30	Decimal

Cut and Eject

The paper is cut and ejected through the presenter module. The RS command automatically gives the eject length of 50 mm in addition to the amount specified by parameter n47.

If the printout length is less than the minimum page length (75 mm or the value specified by n37 and n38, whichever is greater), paper is fed until the minimum printout length is reached before execution of any cut command.



Note • The cut position is 9 mm after the print line. This makes the last 72 dot lines of the previous page end up on the beginning of the next page. To have the printer position the cut after these dot lines, set parameter n49 = 1 (Advance before cut to automatic distance calculation). The auto advance function also adds an additional 16 dot lines (2 mm) of feed due to the width of the cutter blade.

If you prefer to set n49 to 0 (off), you can use a paper advance command to perform the same task:

```
<ESC>J<88><RS>
```

This will position the cut 16 dot lines (2 mm) after the end of the print data.

ESC RS

1B 1E	Hex
27 30	Decimal

Cut Only, No Eject

ESC RS causes the paper to be cut but performs no eject operation.

Eject can be effected with the ESC FF n command (see *Eject (Run Presenter)* on page 61).

To avoid thin strips of paper in the printer, multiple cut commands without paper feed in-between will not be performed. If the printout length is less than the minimum page length (75 mm or the value specified by n37 and n38, whichever is greater), paper is fed until the minimum printout length is reached before execution of any cut command.

Also, refer to the note in RS concerning the cut position with regard to the print line.

```
Text to be printed<CR><LF>
<ESC><RS>
<ESC><FF><30>
```

will print “Text to be printed” and cut and then eject 30 mm.



Note • Use the Cut Only command if you want full control over the printer from your system. When using ESC RS, you must add commands to feed to the correct cut position (if n49 is not set to 1) and commands to eject the paper so that the customer can retrieve the printout.

US

1F	hex
031	decimal

Partial Cut (Unit Separate)

Prints a dotted line, a pair of scissors, and partially cuts the paper from both edges towards the center to make it easier to tear off the paper. This command causes all data in the image buffer to be printed and generates the printout of a fixed page when n36 = 0.

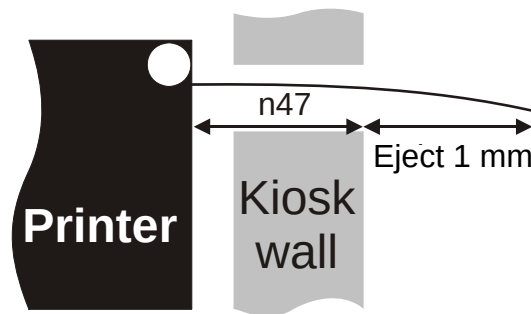
The length of the partial cut can be set with parameter n60. Refer to *Partial Cut Length on page 94* for more information.

ESC FF n1

1B 0C n1	hex
27 12 n1	decimal

Eject (Run Presenter)

ESC FF ejects the document through the presenter module. Variable n1 represents the eject-length in millimeters. The setting of parameter n47 is always added to the value of n1.



The valid range for n is 1 to 127. The range 128-255 is reserved for future use.

Place this command after a cut command (ESC RS) to partially eject the printout to the customer. Set the eject length so that the customer sees that the printout comes out of the kiosk wall. The pull detector gives motorized eject of the rest of the printout when the customer begins to pull the paper.



Note • The cut and eject command RS, automatically ejects 50 mm in addition to the amount stored in parameter n47.

EM n1

19 n1	Hex
25 n1	Decimal

Enforced Clear Presenter

EM n1 functions the same as ENQ but overrides the Retract and Retain parameter (n45) with another presenter behavior. The valid range of n1 is 0 to 255. Values of 0 - 99 cause the printer to eject the paper as with ENQ. Values of 100 - 255 cause paper retraction. The command will clear the presenter immediately (with printing synchronization).

<0>	Ejects the presented page
<100>	Retracts the presented page

ENQ		Clear Presenter	
05	Hex		
5	Decimal		

ENQ clears the paper path of the presenter of printouts. This command completely ejects a document that has not been removed during the print/cut/eject operation. Parameter n45 controls the behavior of this command. If n45 is 0 - 99 or 201 - 255, this command causes a full eject of the media. If n45 is 100 - 199, it causes a full retraction of the media. For example, to eject a document not removed during the previous print/cut/eject operation. Parameter No. 45 controls how the presenter is cleared.

System Related Commands

ESC ?

1B 3F	Hex
27 63	Decimal

Reset (Full)

ESC ? restarts the printer with a complete reset. During this operation, all buffers are purged, all memory is cleared, and stored parameters are reloaded. USB printers will go off the bus during execution of this command and will reconnect when the reset is complete. After issuing this command, wait approximately 3 seconds for the printer to reset before issuing data to the printer.

ESC @

1B 40	Hex
27 64	Decimal

Reset (Initialize)

ESC @ terminates command processing and reinitializes the control board. All parameters are set to power on values and all buffers are purged. After issuing this command, wait approximately 3 seconds for the printer to reset before issuing data to the printer.

ESC & 001

1B 26 01	Hex
27 38 1	decimal

Load Logotype

ESC & 001 stores a logotype bitmap in the flash PROM. The logotype is stored to flash memory and the printer is reset. The logotype can then be printed with ESC g and ESC L commands, see *ESC g n1...n5 on page 57* and *ESC L n1 on page 57*. Also see *Logotypes on page 78*. The printer indicates that storage is complete by operating the presenter motor for a short period of time.

ESC & L

1B 26 4C	Hex
27 38 76	decimal

Erase All Logotypes

ESC & L erases all logotypes stored in the flash PROM. The printer indicates that erasure is complete by operating the presenter motor for a short period of time.

ESC & 004

1B 26 04	Hex
27 38 4	decimal

Store Current Parameter Values

ESC & 004 stores the current setting of all parameter values in the printer's flash memory. These parameters are then used as default power on parameters. Storing the parameters to flash memory takes approximately 4 seconds, during which time the printer cannot communicate. The printer indicates that storage is complete by operating the presenter motor for a short period of time.

ESC & 000

1B 26 00	hex
27 38 0	decimal

Load Font

ESC & 000 is used to load a font to the printer flash PROM. The font is placed in the first free position. The printer indicates that storage is complete by operating the presenter motor for a short period of time. The font position is determined by the order that the fonts are loaded into the printer.

A kiosk printer font file consists of a header containing data describing the font as well as data for each individual character in the font.

Fonts can be designed with the FastFont application included with Toolbox and can be loaded or deleted using the Toolbox application. The fonts loaded are not used by the Windows driver, so it is not necessary to load fonts into the printer to use the Windows driver.

For complete specification of the font format, refer to *Font Loading on page 76*.



Note • The available font memory is printed on the self-test printout. A maximum of 8 fonts may be loaded (numbered 0 to 7). If you attempt to load a font that is larger than available memory or attempt to load more than 8 fonts, the font loading command will not load the font.

ESC & C

1B 26 43	Hex
27 38 67	decimal

Erase All Fonts

ESC & C erases all fonts stored in the flash PROM. The printer indicates that erasure is complete by operating the presenter motor for a short period of time.

ESC & D

1B 26 44	Hex
27 38 68	decimal

Erase Fonts 4 to 7

ESC & D erases the fonts in positions 4–7. Fonts in positions 0–3 are not affected by this command.

The font position is determined by the order that the fonts are loaded into the printer. This command can take up to 20 seconds to execute.

ESC & F

1B 26 46	hex
27 38 70	decimal

Reset Parameter Profile

ESC & F temporarily sets all parameters to predefined default values that are stored in the firmware. To make the default values permanent, store them in the EEPROM with command <ESC>&<4>.

Unless the parameters are stored, a reset command or power cycle will return the parameters to the settings stored in the EEPROM.

ESC & P n1...n2

1B 26 50 n1...n2 hex
27 38 80 n1...n2 decimal

Set Parameter Value

The printer stores its configuration settings in an EEPROM. When the printer is powered on, the values are loaded from the EEPROM. Using this command, a parameter value can be temporarily overridden. The value can later be made permanent with the ESC & 4 command. Permanently stored values are loaded after a printer reset or at power on.

n1	Parameter number, range 1 -255.
n2	Parameter value. Refer to <i>Default Parameter Settings on page 81</i> for information about the valid range for each parameter number.

Set Several Parameters at Once

You can use this command to set multiple parameters at once. The format for this option is as follows:

ESC & P 000 n2 n3 data

When operating in this mode, specify a value of 0 for n1, the first parameter you want to set for n2, and the number of parameters to set for n3, followed immediately by the parameter data.

To set parameters that extend over a range in which the parameter number is not defined, specify 0 for the parameters that do not exist. For example, to set n4 to n7, you must provide all four parameters in data even though n6 does not exist.



Example • This example sets the first 5 tabs to 5, 10, 15, 20, and 25. (n2 = 5, n3 = 5)

<ESC>&P<000><015><005><005><010><015><020><025>

Store parameters permanently by sending <ESC>&<4>.

ESC & s n1

1B 26 73 0A Hex
27 38 115 10 Decimal

Load SPI Slave Firmware

This command is only valid for the following:

- TTP 2110, Serial No. higher than 2-0913-27444
- TTP 2130, Serial No. higher than 2-0913-27471

The TOF sensor has its own firmware that can be upgraded using this command.

n1	SPI Slave address, for the sensor board, the address is 10 dec.
<file>	the bin file with the new firmware

ESC NUL

1B 00	Hex
27 0	Decimal

Load Firmware

This command should be used when you integrate firmware loading into your kiosk program. After transmitting this command, send the firmware binary file. If the firmware is the proper version for the printer and the firmware checksum is valid, the firmware is then programmed into the printer's flash memory. This process can take up to 60 seconds and the printer will reset when the process is complete.



Note • The Toolbox application can be used to load new firmware.

Status Reporting Commands



Important • All status commands except for the acknowledge marker are immediate. This means that these commands bypass the print queue and are answered as soon as they possibly can be.

Status codes are reset when:

- the conditions causing them are removed
- the printer is power cycled (turned off/on)
- the printhead is lifted and then lowered to clear a paper jam.

ESC ENQ 001

1B 05 01	Hex
27 5 1	decimal

Status Enquiry

ESC ENQ 001 issues a status enquiry that results in response ACK (06h) if there are no errors, or NAK (15h) and a byte indicating an error if one or more sensors report some condition.

Table 3 • Status Codes

Status Code	Meaning
ACK	OK (printer is operable)
NAK 01h	Paper left in presenter module. Attempt to clear the paper path failed.
NAK 02h	Cutter jammed
NAK 03h	Out of paper
NAK 04h	Printhead lifted
NAK 05h	Paper-feed error. No paper detected in presenter although 10 cm has been printed. Paper might be wound around the platen or, in some way, has been forced above the presenter module.
NAK 06h	Temperature error. The printhead temperature has exceeded the 60 °C maximum limit.
NAK 07h	Presenter not running
NAK 08h	Paper jam during retract
NAK 0Ah	Black mark not found
NAK 0Bh	Black mark calibration error
NAK 0Ch	Index error
NAK 0Dh	Checksum error
NAK 0Eh	Wrong firmware type or target for firmware loading
NAK 0Fh	Firmware cannot start because no firmware is loaded or firmware checksum is wrong.
NAK 10h	Retract function timed out. If the customer doesn't take the paper and the printer clears the presenter due to a timeout, the pending error bit is set and error code NAK 10h is reported.



Note • Errors 0B, 0C, and 10 are one-time errors that clear once they are read.



Important • Errors 02h and 05h are terminal faults that require you to reset the printer before it will be operable again. A reset means that any data in the buffer is lost. The printer automatically recovers from the other conditions as soon as the condition is corrected.

ESC ENQ 1 can only return one status code at a time. If there are two or more simultaneous conditions, each condition should be cleared and the status enquiry repeated in order to get a complete report of all status codes.

The host computer cannot be certain that all conditions have been cleared until an ACK is received.

In the case of multiple error conditions, the one with the lowest number is reported.



Note • To read out all status information at once, use ESC ENQ E.

ESC ENQ 002

Paper-near-end Enquiry

1B 05 02	hex
27 5 2	decimal

This command requests a paper-near-end sensor (paper low) status from the printer in a 1-byte format.

Value = (01h)	indicates “No paper”
Value = (00h)	indicates “Paper present” at the sensor position



Note • The status of the sensor is sampled every time the printout is cut. If three successive samples show that there is no paper present at the sensor, the status reply changes to 1. This is to prevent false readings if the side of the paper roll is not clean. If you want instantaneous status of the sensor, use ESC ENQ 6 and examine the paper near end bit.

Send→ <ESC><ENQ><4>

1: ↵

2: ↖

3: ↖

4 : ↩

5: ↵

6: ↩

7: ↩

```
Free font memory:123082↵
```

00:38 117 Zebra Logo ←

01: ↩

02: ↵

03: ↵

04: ↩

05: ↵

06: ↩

07: ↩

08: ↵

09: ↵

10: ↩

11: ↵

12: ↩

13: ↵

14: ↩

15: ↵

16: ↩

```
Free logo memory:126352↵
```

ESC ENQ 005

1B 05 05	hex
27 5 5	decimal

Sensor Enquiry

ESC ENQ 5 returns a 2-byte response, reflecting the status of all virtual sensors. Virtual sensors maintain their functionality in all configurations of this printer, while physical sensors reported by ESC ENQ 6 may signal differently depending on installation factors such as vertical or horizontal installation.

The same physical sensor can give several virtual statuses depending on when the sensor is activated in the print cycle.

The first byte of the response is reserved for future use.

Second Byte:

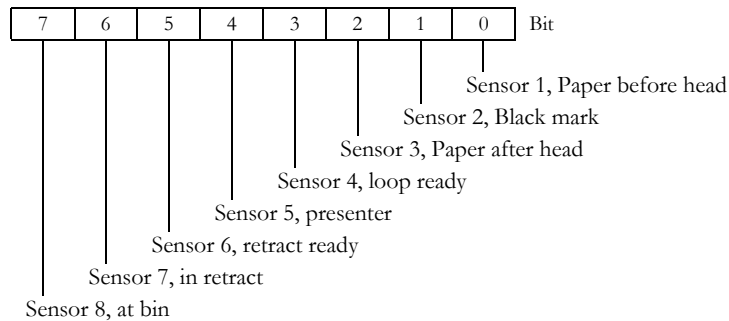
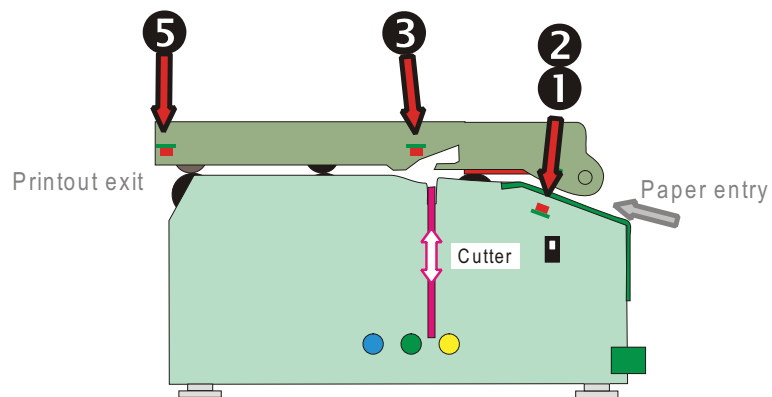


Figure 27 • Physical-to-virtual sensor mapping



ESC ENQ 006

1B 05 06 hex
27 5 6 decimal

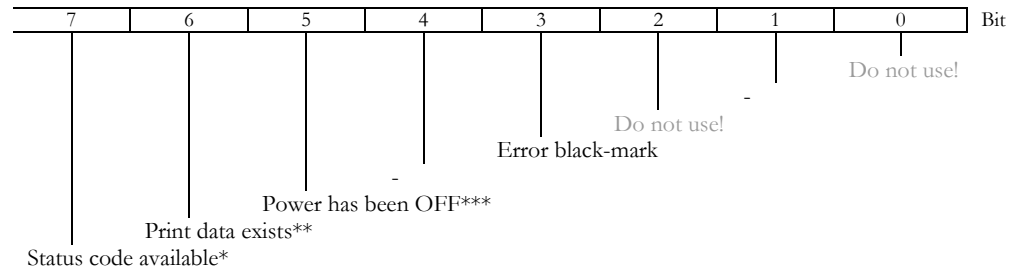
Status Report



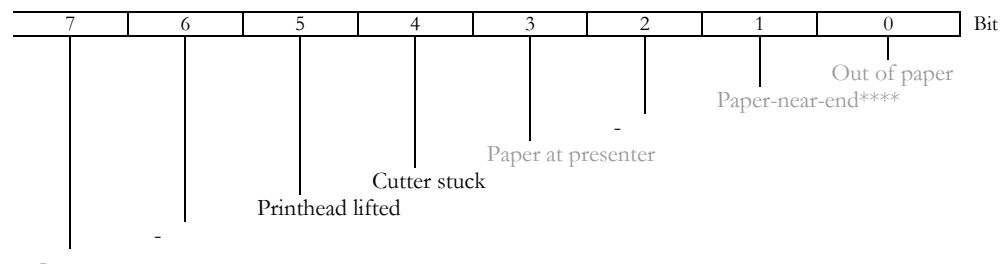
Note • The sensor status reported in the status report are for compatibility with older printers. Please use ESC ENQ 5 in new applications. Refer to *ESC ENQ 005* on page 70 for more information.

Results in a 2-byte response, reflecting the status of each sensor. This command is intended as a go/no go indication.

First Byte:



Second Byte:



Note • Mask away the undefined bits in your application program to avoid having to change the application, if future firmware releases starts using them.

- Mask first reply byte with E8h.
- Mask second reply byte with BBh.

*	This bit indicates that a status code is available. Use ESC ENQ 1 or ESC ENQ E to fetch it.
**	This bit tells you that there are data in the printer that have not yet been printed. There are two possible reasons for that: 1. The last command received by the printer was not a command that triggers a printout. 2. The printer is printing.
***	When parallel cable is connected, both printer and host computer must have been off to set this bit. This is because the interface powers the RAM in the printer.
****	This paper-near-end bit differs from the ESC ENQ 2 response, see ESC ENQ 002 on page 68.

Bit 4 and 5 in the first byte are reset when read.

ESC ENQ 007

1B 05 07	Hex
27 5 7	decimal

Firmware-Version Enquiry

Results in a 2-byte response representing the version of the installed firmware.

The first byte represents major versions, and the second byte minor versions.

If no firmware is loaded, the printer will answer with 00h.



Example •

Send→ ESC ENQ 07d

Read← <02h><29h>

That is, a response with the value <02h><29h> indicates version 2.41.

ESC ENQ 009

1B 05 09	hex
27 5 9	decimal

Control Board Serial-Number Enquiry

Results in an 6-byte response representing the serial number of the control board.



Example •

Send→ ESC ENQ 09d

Read← 00h 00h 02h 2Bh C6h 28h (hex), or 000 000 002 043 198 040 (dec)

ESC ENQ 010

1B 05 0A	hex
27 5 10	decimal

Control Board Revision Enquiry

Results in a 1-byte response representing the control board revision. A minus sign indicates that no revision has been made, while A indicates the first revision, and so on.



Example •

Send→ ESC ENQ 10d

Read← n Where n can be 'A' (ASCII) or 41h (hex) or 065 (dec)

ESC ENQ 011

1B 05 0B	hex
27 5 11	decimal

Head Temperature Enquiry

Results in a 1-byte response representing the temperature of the printhead.



Example •

Send→ ESC ENQ 11d

Read← n Where n is a value representing the approximate temperature in Celsius.

The answer is an signed byte (two's complement). If bit7 is 1 than it's a negative value, invert all bits and add 1 the get the value.

ESC ENQ 012

1B 05 0C	hex
27 5 12	decimal

Bootware Version Enquiry

Results in a 2-byte response representing the version of the installed bootware.

The first byte represents major versions, and the second byte minor versions.



Example •

Send→ ESC ENQ 12d

Read← <001><030>

That is, a response with the value <01h><30h> indicates version 1.48.



Note • TTP 2100 does not store the bootware in the printer so this query will always return <000><000>.

ESC ENQ c

1B 05 63	hex
27 5 99	decimal

Device ID Enquiry

Results in a string containing the device ID in the Windows Plug and Play string format. The two first bytes represent the string length.



Example •

Send→ ESC ENQ 99d

Read← 00d 106d This indicates that the string is 104 characters (plus two characters indicating the string length).

ESC ENQ E

1B 05 45	hex
27 5 69	decimal

Read Extended Status

Extended status is status from the printer together with devices connected to the I²C options-bus available in some Zebra printers (the TTP 2100 series does not have any I²C bus so these parts of the command can be ignored). The short message protocol gives replies up to 255 bytes. Other protocols may be defined in the future. Protocols are described in separate documents.

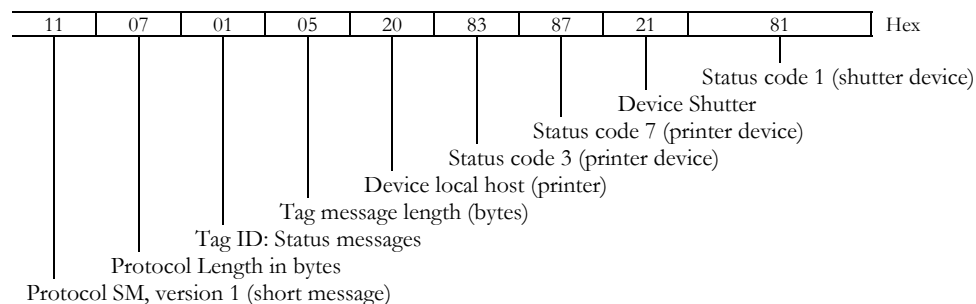
ESC ENQ E results in a variable length reply:

n1	Protocol version, 11h = Short Message Protocol
n2	Protocol length in bytes
n3-n255	Data specified by the protocol

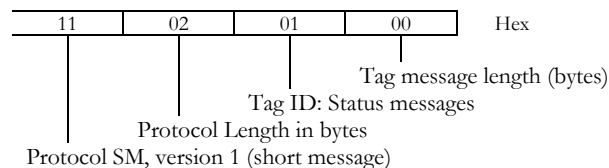
Short Message Status Examples



Example 1 • Out of paper presenter Jam, and shutter open error.



Example 2 • No errors in any device.



ESC ENQ P n1

1B 05 50 n1	hex
27 5 80 n1	decimal

Parameter-Setting Data Enquiry

This command requests information about the setting of parameter n1, that is, the parameter value stored in EEPROM or any parameter value temporarily set by other ESC commands.

n1= 1	Gives the setting of parameter 1, etc. The parameter names are listed under <i>Summary of Parameter Settings</i> on page 83.
n1 = 0	Gives a response where the first two bytes specifies the length of data to come, and then follows a block of data for all parameters in the temporary setup.

ESC ACK n1

1B 06 n1	hex
27 6 n1	decimal

Acknowledge Marker

n1 =	One-byte marker. Range 1h to 255h.
------	------------------------------------

The “acknowledge marker” n is placed in the command queue and when the execution of commands reaches the marker it is sent back to the host computer. This is an addition to the status commands that pass the queue and are answered immediately when received.



Example •

"Print data" <LF><ESC>p<ESC><ACK><01h>

Wait for <01h>

<RS><ESC><ACK><02h>

Wait for <02h>

The printer will send <01h> when <print data> has executed and <02h> when the ejecting has been performed.



Note • You must wait for the acknowledge marker to return before sending any more data to the printer.



Note • Acknowledge marker cannot be used for events that write to the flash PROM, for instance font loading. This is because the writing procedure erases the buffer, including the markers, and uses all RAM in the printer.

Font Loading

The printer can store 8 fonts in its flash PROM. The memory available for fonts is printed on the self-test printout. The character size is fixed, so you must load one font file for each character size you require. The fonts are given font numbers when they are loaded into the printer. The first font is assigned number 0 and the next font 1 etc. up to font 7. Parameter p14 “Font Selection” will determine what font to use when no font selection command has been received (see *Font Selection* on page 87).

You cannot erase a single font, but must erase font 4-7 with command ESC & D, or all eight fonts with ESC & C, then reload the fonts you wanted to keep.

Windows software for font generation and management is available on the Zebra web site. If you need to load fonts in a non-Windows environment, use the ESC & NUL command.

The time required for processing the font data that is loaded is typically 15–20 seconds per font, excluding transfer time. During this time, any data sent to the printer will be lost.



Note • The font processing ends with a reset. The presenter motor runs momentarily to indicate that the printer is ready to be used.



Caution • Loading to the flash PROM will erase the RAM completely since the RAM is used during the loading process. Any print data residing in RAM will thus be lost.

File Format

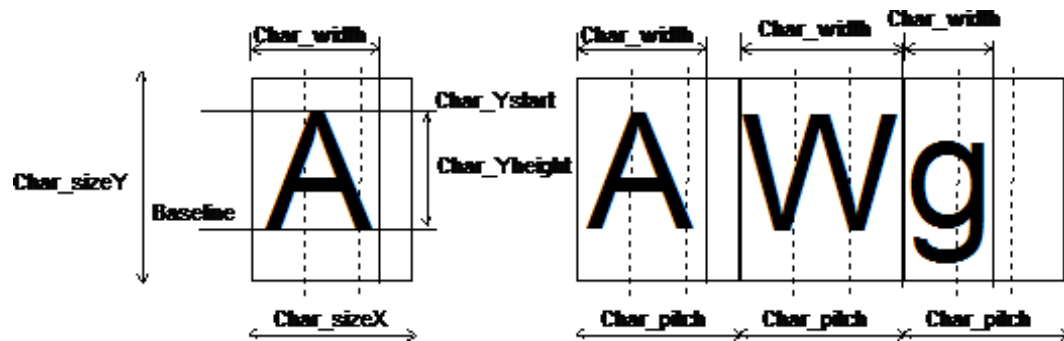
A font consists of a header describing the font, then data for every character in the font. The header has to be downloaded even if the font consists of a single character only. Below is a description of the font header.

1 byte	Reserved	Should always be 0 (zero)
1 byte	Reserved	Should always be 0 (zero)
1 byte	Char. width (X)	The number of bytes required for the width of one character, usually 2 or 3. Range 1 to 8.
1 byte	Character pitch	The maximum width of one character in the set. This value is used for tab position calculation. Range 1 to 255.
1 byte	Char. height (Y)	The maximum height of one character matrix measured in pixels. This is also the minimum line spacing for this character set.
27 byte	Font name	String of characters used to identify the character set. This will be printed on status printouts. (E.g. Swiss 10 cpi.)

Char_matrix table: 256 records, each containing 3 bytes.

3 byte Char_width (pixels) + Char_Ystart (pixels) + Char_Yheight (pixels)

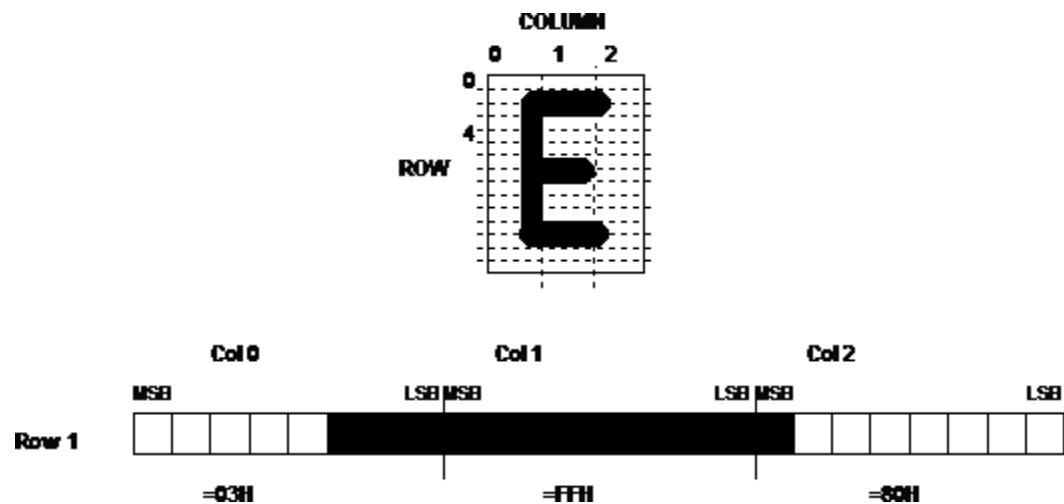
Char_bitmap data: Bitmap data for all characters that are to be defined.



Character Bitmap Data

A character is made up of a bitmap the size of which is:

Char. width (X) * Char. Height (Y) bytes.



The bitmap data consists of bitmap patterns for each character in a character set for which the parameter Char_width in the Char_matrix table is set to a value between 1 and 24. A character that has its Char_width set to zero, is not included in the bitmap data.

The bitmap for one character is then defined according to the following table:



Example • In this example, each row consists of 3 columns equal to 3 bytes.

(COL 0, ROW Ystart), (COL 1, ROW Ystart), (COL 2, ROW Ystart)

(COL 0, ROW Ystart+1), (COL 1, ROW Ystart+1), (COL 2, Ystart+1)

(COL 0, ROW Ystart + Yheight), (COL 1, ROW Ystart + Yheight), (COL 2, ROW Ystart + Yheight)

In order to minimize the required storage space, only rows between Ystart and Ystart + Yheight are included in the character bitmap.

Logotypes

Up to 16 logotypes can be stored in the flash PROM of the printer. The logotypes can be positioned and printed out with commands `ESC g` or `ESC L`.

The exact number of logotypes and their sizes is determined by the total amount of memory used for fonts, logotypes and loaded firmware. Make a test printout to see how much memory is available.



Note • Logotype No. 0 is printed in the top of the self test printout, so this can be used to customize the self test printout.

Loading

Windows software that converts black and white BMP bitmap files to logotypes and loads them into the printer is available on the Zebra web site. If you need to load logotypes in a non-Windows environment, use the `ESC & 1` command.

The time required by the printer to process logotype data, excluding transfer time from the PC, is typically 15 to 20 seconds, per logotype. During this time, any data sent to the printer will be lost.

File Format

A header containing information about the logotype number, size and logotype name shall define each loaded logotype. Immediately after the header follows the actual bitmap of the logotype.

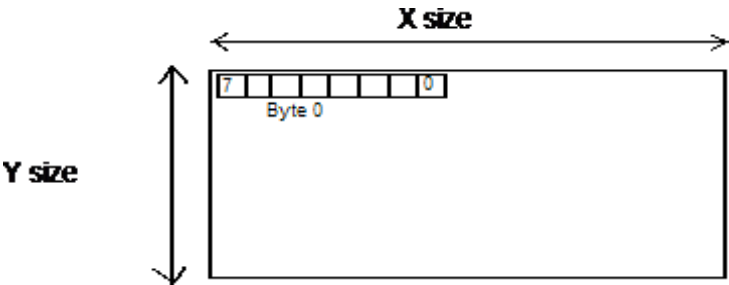
`ESC & 01H <Header><Bitmap>`

Header

Byte 0	Logotype number used to identify the logotype when printing.
Byte 1	X size measured in bytes.
Byte 2	Y size measured in pixels.
Byte 3—15	A logotype name that will be printed on test printouts.

Bitmap

The bitmap **must** have exactly (X size * Y size) number of bytes. 1=black, 0=white dot.
Bit No. 7 in byte 0 represents the top left corner of the logotype.



Printing

To print a logotype you can use two commands, ESC L n1, prints the logotype at the current cursor position, just like any character. ESC g n1 n2n3 n4n5 prints the logotype at a specified X-Y position.

n1	One byte logotype number, (0—15)
n2n3	Two byte X position measured in pixels from the left hand edge of the print window.
n4n5	Two byte Y position in pixels from top of the page. These bytes must always be inserted but they are ignored in variable-page-length mode where logotypes are always printed at the current Y-position.

Erasing

All logotypes are erased with the ESC & L command.

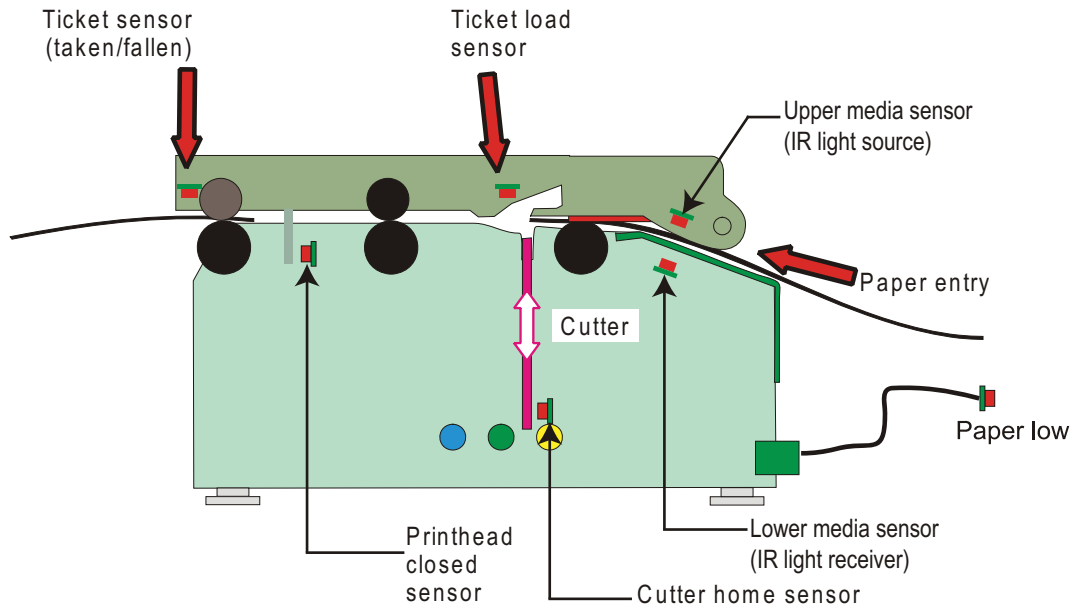


Caution • Loading to the flash PROM will erase the RAM completely since the RAM is used during the loading process. Any print data residing in RAM will thus be lost.

Status Reporting

The printer is equipped with a number of sensors that report the printer status and various conditions such as out-of-paper, previous printout not removed, etc.

Figure 28 • Sensor placement in the printer



A good practice in unattended printer applications is to check for errors and paper availability before printing.

1. Send a Status Report Query (ESC ENQ 6) and check that the answer is "No errors"
2. If "Status codes available" is indicated, read out the status message with Status Request (ESC ENQ 1), and take appropriate actions.
3. Send a paper-near-end query (ESC ENQ 2) to see if the sensor reports low paper level.
4. If paper-near-end is indicated, report the condition to the systems supervisor to schedule a service visit to the printer.
5. Print the printout.



Note • A status reply must be read! Sending a second status query without reading the reply of the first query may lock the printer.



Note • When using a multitask OS, status queries and responses may not be transferred immediately from your application to the printer and vice versa. So write your program in such a way that it repeats the query if it gets a timeout or an invalid reply. Good practice is to ask once every ten seconds, five times before giving up.



Note • You should construct your application in such a way so as not to request status while printing, as this can result in loss of data.



Default Parameter Settings

Some of the printer settings can be stored in an EEPROM so that they will be used also after power OFF.

The stored parameter settings are printed out on the self-test printout.

The number in front of the function is the parameter number (n) used when setting the parameter with the command `<ESC>&P<n><v>`.

You can use the parameter settings like normal commands. Either send the parameter values with each printout, or set them up once and then send `<ESC>&<4>` to store all settings in the EEPROM.

You can always return to factory default settings by sending `<ESC>&F`, and then storing those settings with `<ESC>&<4>`.

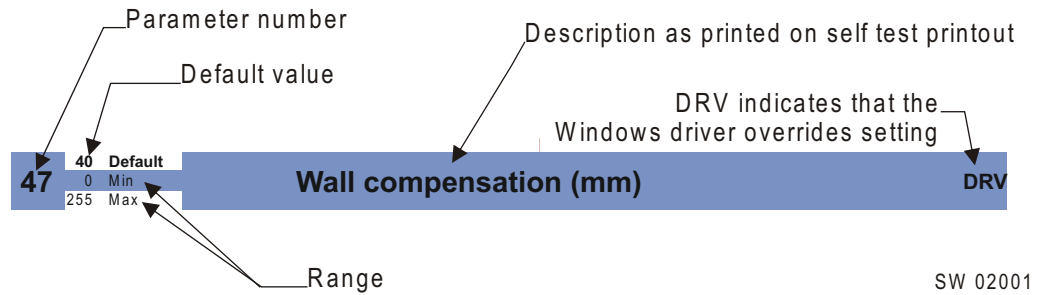


Note • The parameters can be locked so that no changes are possible. Check parameter 53 on the self-test printout to find out.



Note • If you try to set a parameter to an invalid value, the parameter will be set to the nearest valid value below.

How the Parameters are Described



Default Value

The default values indicated are "factory default settings" you get by sending <ESC>&F. These are not necessarily the settings that your printer was originally delivered with because many printers have customized settings when delivered.

Examples

Command examples are formatted in Courier and typed in the same way as used in the Zebra Toolbox:

```
<ESC>&P<1><19>
```

Where <ESC> means the escape character 27 decimal (hex 1B). Numbers between less-than and greater-than characters, for example <1><15>, means 1 and 15 decimal (hex 1 and F).

Summary of Parameter Settings

Parameter	Description	ESC&F Default	Page	TTP model	
				2110	2130
1	Baud rate	96 (9600 Baud)	85	X	
2	Data bits	8	85	X	
3	Parity	0 (No parity)	85	X	
4	Flow control	2 (Hardware)	85	X	
7	Burn time	9	86	X	X
8	Print speed	17 (123 mm/s)	86	X	X
10	Pulse control	3 (2 burn pulses)	86	X	X
12	Font attributes	0 (off)	86	X	X
13	Line spacing	0 (Auto)	87	X	X
14	Font selection	0 (ATM9)	87	X	X
15 to 30	Tab stop	4, 8, 12 etc.	87	X	X
33	CR/LF	0 (LF = CR/LF, CR=Ignored)	87	X	X
34	Auto cut after FF	1 (Off)	88	X	X
35	Black mark sync	1 (On)	88	X	X
36	Document mode	1 (Variable)	88	X	X
37 & 38	Page length, Minimum / fixed / BM	2, 88 (75 mm)	88	X	X
39	Max black-mark length	80 (10 mm)	90	X	X
40	Min black-mark length	24 (3 mm)	90	X	X
41 & 42	Black-mark cut offset	0, 0 (0 mm)	90	X	X
43 & 44	Black-mark top margin	0, 0 (Disabled)	90	X	X
46	Cut position calibration	128 (no adjustment)	91	X	X
47	Wall compensation	0	91	X	X
48	Paper width	0 (Auto)	92	X	X
49	Advance before cut	0 (Off)	92	X	X
51	Black-mark level	75	92	X	X
52	Warning level	0 (Off)	92	X	X
56	Max status code	255	93	X	X
53	Lock parameters	0 (Unlocked)	93	X	X
57	System	247 (Gap sensor)	93	X	X
58	Out of paper level	0	94	X	X

Parameter	Description	ESC&F Default	Page	TTP model	
				2110	2130
59	Vendor class mode	0 (Disabled)	94	X	X
60	Partial cut length	10	94	X	X
61	TOF Sensor Mode	2 (Gap sensor)	95	X	X
62	TOF Sensor Mask	0 (Masks away sensor 2 and 3)	95	X	X
63	BM Sensor	0 (auto selection between 1 and 4)	95	X	X



Note • When the printer is set up the way you like it to be, you send <ESC>&4h, and all settings will be stored.

Serial Interface Set-up

1	96	Default	
	11	Min	
	96	Max	

Baud Rate

Stores the communication speed on the serial interface.

<ESC>&P<1><24>	2400 bps
<ESC>&P<1><48>	4800 bps
<ESC>&P<1><96>	9600 bps
<ESC>&P<1><192>	19200 bps
<ESC>&P<1><384>	38400 bps
<ESC>&P<1><576>	57600 bps
<ESC>&P<1><1152>	115200 bps



Note • If you set an invalid value, the baud rate will return to the previous value.

2	8	Default	
	7	Min	
	8	Max	

Data Bits

Selects if 7-bit ASCII, or 8-bit, is used on the serial interface.

<ESC>&P<2><8>	8-bits (characters 0-255)
<ESC>&P<2><7>	7-bits (characters 0-127)



Note • In 7-bit mode you can not print graphic, read status or set parameters because no value can ever be greater than 127.

3	0	Default	
	0	Min	
	2	Max	

Parity

Select what parity to use on the serial interface.

<ESC>&P<3><0>	No parity
<ESC>&P<3><1>	Odd parity
<ESC>&P<3><2>	Even parity

4	2	Default	
	0	Min	
	2	Max	

Flow-control

Select what handshaking to use on the serial interface.

<ESC>&P<4><0>	No flow control
<ESC>&P<4><1>	Xon / Xoff
<ESC>&P<4><2>	Hardware

Print Setup

7	9 Default 1 Min 15 Max	Burn Time	DRV
---	------------------------------	------------------	-----

A long burn time gives darker print. On insensitive paper types you may have to increase the burn time to get an acceptable print quality.

8	19 Default 1 Min 19 Max	Max Print Speed	DRV
---	-------------------------------	------------------------	-----

The main reason to decrease the print speed is to enhance print quality, and to reduce average current consumption.

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
mm/s	47	48	49	50	51	52	53	55	57	61	65	70	77	86	96	107	123	136	150



Note • Settings below 15 result in printer chassis resonance causing increased noise and deteriorated print quality.

10	3 Default 3 Min 7 Max	Printhead Pulse Control	
----	-----------------------------	--------------------------------	--

Controls how the printhead burns the pixels. Four burn pulses give a more even blackness over the width of the paper and a lower peak current consumption. Two burn pulses give faster printouts at high burn times. At normal burn times the speed is the same for both settings.

<ESC>&P<10><3>	2 burn pulses
<ESC>&P<10><7>	4 burn pulses



Caution • Values 3 and 7 are the only allowed settings. Do not set anything else!

12	0 Default 0 Min 255 Max	Font Attributes	
----	-------------------------------	------------------------	--

Selects which font attributes are selected at power ON or after reset. Font attributes bold, height and width are stored in this parameter.

bits 0-3	Height Multiplier
bits 4-6	Width Multiplier
bit 7	Bold enable

13 0 Default
0 Min
30 Max **Line Spacing**

The line spacing is normally set by the font height. With this parameter you can set a line spacing that is higher than the font height. Line spacing settings lower than the font height will be ignored.

<ESC>&P<13><30>	30 pixels or font height, whichever is the largest
-----------------	--

14 0 Default
0 Min
7 Max **Font Selection**

Store which font number is used if no font is specified. Font is selected using the “Select Font” command <ESC>!<n>. Selecting an invalid font gives a software error status message (invalid index).

15 to 30 - Default
1 Min
255 Max **Tab Stop**

Stores 16 different TAB stop positions. The position is set in increments of 2.5-mm.

Tab position 255 sets a tab stop on the last position of the line. Use this if you want underline or reversed text to extend across the full paper width.

To set all tab stops at once, follow the procedure *Set Several Parameters at Once* on page 65.

To move a single tab stop, use the set parameter command <ESC>&P . For example:



Example • This example sets the first tab stop 25 mm from the left margin.

<ESC>&P<15><10>

Default positions are one TAB on each cm; that is parameter values 4, 8, 12 etc.

33 0 Default
0 Min
4 Max **CR/LF Behavior**

Carriage Return and Line Feed can be interpreted in five different ways to suit different operating systems.

<ESC>&P<33><0>	LF = CR/LF	CR = Ignored
<ESC>&P<33><1>	LF = CR/LF	CR = CR
<ESC>&P<33><2>	LF = LF	CR = CR
<ESC>&P<33><3>	LF = LF	CR = CR/LF
<ESC>&P<33><4>	LF = Ignored	CR = CR/LF



Note • The character currently interpreted as LF converts text from the input buffer to pixels on the paper. If no such character has been received after 379 characters, a linefeed is inserted automatically.

34	1	Default	Auto Cut After FF
	0	Min	
	1	Max	

Decides if the printer should cut after executing an FF command, or if it should just feed the form length.

<ESC>&P<34><0>	No cut
<ESC>&P<34><1>	Cut

35	1	Default	Black Mark Sync	DRV
	0	Min		
	1	Max		

Determines what should control the page length:

<ESC>&P<35><0>	No synchronization
<ESC>&P<35><1>	Cuts will be synchronized with black marks / gaps.

This parameter also determines the function of auto sensor calibration:

- If black mark / gap sync is enabled, the auto calibration will set n37 - n40, n51, n57 bit 3, n58, n61, and n62.
- If set to zero, only the BM level n51, and out of paper level n58 will be set.

36	1	Default	Document Mode	DRV
	0	Min		
	1	Max		

Determines what should control the page length:

<ESC>&P<36><0>	Fixed Document Mode. Shorter documents will automatically be extended, while longer documents will be divided into several pages of the desired length. Page length will be the length set by parameters 37 and 38
<ESC>&P<36><1>	Variable Document Mode. The length of the page varies with the contents (printouts shorter than the value specified by parameters 37 and 38 will be extended to that length)



Note • Max page length in Fixed Document Mode is A5-size, which is 148.5 mm.

37 & 38	2, 88	Default	Page Length	DRV
	0, 0	Min		
	255, 255	Max		

Defines three different things:

1. The minimum length of a page in variable document mode
2. The actual page length in fixed document mode
3. The distance between black-marks in black-mark mode

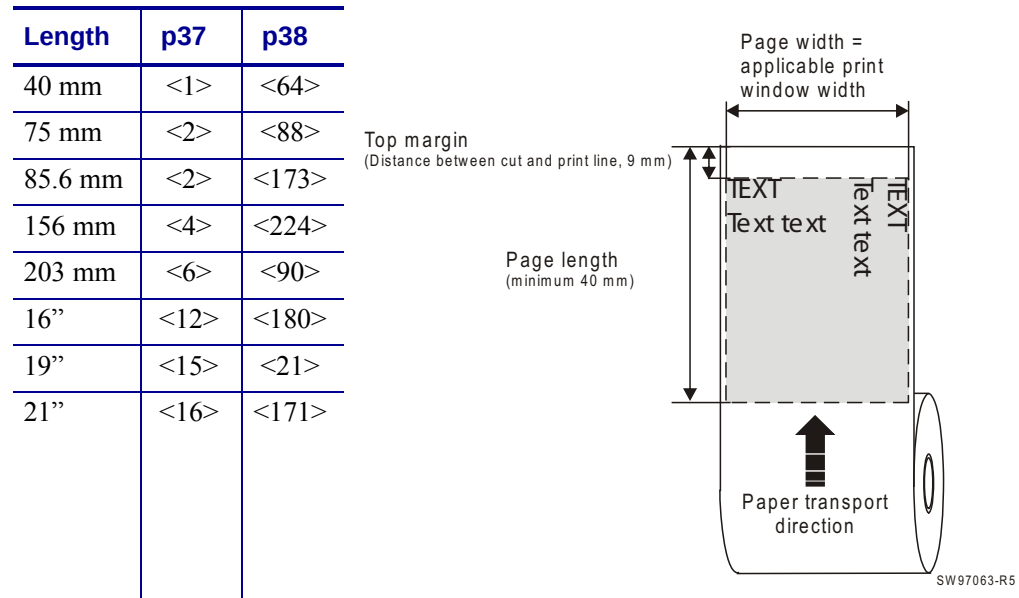


Note • If auto calibration has been used, it is not necessary to make any changes to this parameter.

One step is 0.125 mm. Settings shorter than 37 mm will be extended to 37 mm when printing.

<ESC>&P<37><2><ESC>&P<38><88>	Set page length to 75 mm.
-------------------------------	---------------------------

Figure 29 • Definition of Page Size



Fixed Document Mode

Max *fixed document mode* page length is depends of the amount of free ram. Make a self-test printout to check how much is available in your printer. (Depends on firmware version).

$$\text{Page length} = \frac{\text{Free RAM in bytes} \times 1024}{\text{Paper width}} - \text{top margin} \times \text{bottom margin}$$

Paper length, top, and bottom margins are in pixel lines. Paper width is in bytes or mm. (1 byte = 1 mm.).



Example • If Free RAM on a TTP 2100 is 114627 bytes, print width is 80 mm = 80 bytes, top margin is 20 mm, and bottom margin 10 mm (20 x 8 = 160 and 10 x 8 = 80 pixel lines).

$$\text{Page length} = \frac{114627 \times 1024}{80} - 160 \times 80 = 1180 \text{ pixel lines} = 147 \text{ mm}$$

If a too large fixed page is specified the printout will be blank from memory full to the cut.

39 50 Default
1 Min
160 Max

BM (Black-Mark) Length

Specifies the length of the black-mark in 0.125-mm steps. Measure the length of the black-mark on your paper and enter that value here.

Marks 5 mm longer than this value are interpreted as paper out. The default value of 80 equals 10 mm.

<ESC>&P<39><40>

Sets max black-mark length to 5 mm.

40 30 Default
1 Min
159 Max

Min BM (Black-Mark) Length "Garbage Filter"

Specifies the minimum length of the black-mark in 0.125-mm steps. Shorter marks are ignored. The default value of 24 equals 3 mm.

<ESC>&P<40><36>

Sets minimum black-mark length to 4 mm.

41 & 42 0,0 Default
0,0 Min
255,255 Max

BM (Black-Mark) Cut Offset

Defines the paper feed between the black-mark detection and cut. One step is 0.125 mm.

<ESC>&P<41><1><ESC>&P<42><144>

Feeds 50 mm between black-mark and cut.

<ESC>&P<41><0><ESC>&P<42><0>

Automatically sets cut offset so the printer cut is in the middle of the black mark.

43 & 44 0,0 Default
0,0 Min
255,255 Max

Top Margin (mm)

Defines the distance between the cut in Black-mark mode and the top of the first text line in 0.125 mm steps. The top margin feed is effectuated when the presenter is cleared from the previous page.

0

Disabled top margin. This gives the physical top margin of the printer, which is 9 mm.

Settings that give a shorter margin than 9 mm will be extended to 9 mm so this parameter can only be used to extend the margin, not reduce it.

<ESC>&P<43><0><ESC>&P<44><240>

Add 30-mm top margin.

46 0 Default
0 Min
255 Max

Cut Position Calibration

Calibrates the cut position. The value is a signed byte.

A change of 1 moves the cut 1/8 of a mm *more* than normal.

A change of -1 moves the cut 1/8 of a mm *less* than normal. -1 is entered as 256-1=255

The positive range is 1-127. The negative range is 128-256

This parameter can be individually set for each printer and is not affected by the driver or reset commands. It is used to compensate for differences in sensor position in production. After moving or replacing the TOF-sensor, the calibration may have to be done again.



Note • The cut is not 100% repetitive because the paper may be closer to the sensor for one ticket than it is for the next. So do not expect a perfect synchronization between perforation and cut.

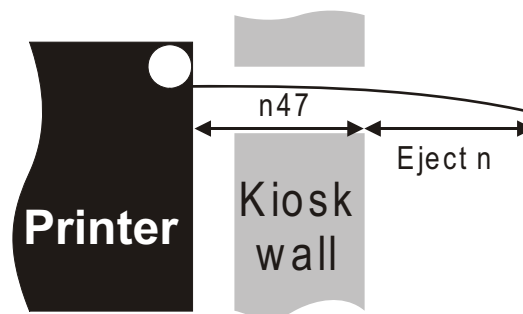
It is better to cut slightly after a perforation than before because cutting before perforation leaves a flap that is pushed through the printer and that may cause paper jam.

47 40 Default
0 Min
255 Max

Wall Compensation (mm)

DRV

When the printout is printed and cut, the presenter ejects 50 mm of the page so that the customer can grab it. If the kiosk wall is thick, or if you just want a longer part of the printout to be visible, this parameter adds extra eject length.



<ESC>&P<47><50>

Adds 50 mm extra eject = 100 mm in total.

48	0 Default 0 & 20 Min 80 Max	Paper Width (mm)	DRV
----	-----------------------------------	------------------	-----

Sets the width of the paper loaded into the printer. The range is 20 to 80 mm. This can also be used to get left and right margins, for instance if you load 80 paper but set the paper width to 60 mm you get a 10 mm margin on both sides of the page.



Note • You should not change paper width within a page.

<ESC>&P<48><0><ESC>&<4>	Position of sensor selector switch on TOF sensor board selects width (54 or 72 mm)
<ESC>&P<48><60><ESC>&<4>	Sets 60 mm print width



Note • We recommend you to set a somewhat narrower print width than the loaded paper width to allow the paper to wander a bit sideways without losing print.

49	1 Default 0 Min 1 Max	Advance Before Cut	DRV
----	-----------------------------	--------------------	-----

Selects if the cut command cuts at the position where the paper is at, or if the printer should advance the paper before cutting.

<ESC>&P<49><0>	Off
<ESC>&P<49><1>	Automatic Distance Calculation

Set to 1 if the printer is used in text mode and 0 if it is used from a driver that takes care of this in the driver.



Note • The paper is advanced before the FF command calculates the page length to see if the page length is longer than the set minimum length.

51	50 Default 0 Min 255 Max	Black-Mark Sensitivity	
----	--------------------------------	------------------------	--

Sets the lever at which the sensor output is interpreted as paper or as black-mark.

0 is white and 255 is pitch black.

52	0 Default 0 Min 255 Max	Warning Level	
----	-------------------------------	---------------	--

Turns on/off indication of Paper near end level on the status indicator. This affects only the status indicator, not the status enquiries

<ESC>&P<52><0>	No indication
<ESC>&P<52><1>	Paper Near End indication

53 0 Default
0 Min
1 Max

Lock Parameters

You can lock the parameters so that they cannot be changed by the ESC & P command.

<ESC>&P<53><0>	Unlocked
<ESC>&P<53><1>	Locked

56 255 Default
0 Min
255 Max

Max Status Code

This will control the highest status code that is reported by ESC ENQ x06 and ESC ENQ x01 (Pending-status-code bit). You use this if your kiosk software is not written so it masks away unknown status messages.



Example • If you want the TTP 2100 to be compatible with software written for TTP 1020, set parameter 56 to 6h and error codes 7 and up will not be reported.

57 247 Default
0 Min
255 Max

System

The system parameter will control up to eight system components in the printer.

The bits specified so far are these:

Bit 0	Clear presenter at reset
Bit 1	Pull detector
Bit 2	-
Bit 3	Standard BM
Bit 4	Disable USB reconnect

Setting a bit to 1 enables the function and setting it to 0 disables it.



Note • Bits whose function are not yet specified must always be set to 1.



Examples •

<ESC>&P<57><254> Presenter will not be cleared at power ON and reset.

<ESC>&P<57><253> The pull detector is disabled.

<ESC>&P<57><252> The presenter will not be cleared at power ON and reset and the pull detector is disabled.

<ESC>&P<57><239> The printer will monitor USB heartbeat, and thus try to reconnect if it disappears.

<ESC>&P<57><247> The printer is reset to normal behavior (gap sensor)

58	0	Default	Out-of-Paper Level
	0	Min	
	255	Max	

Sets the level at which the TOF sensor detects out of paper. The out-of-paper level may differ from the black-mark level on label stock where the foil opacity indicates top of form.

This parameter is set automatically when you run the “Calibrating the TOF sensor procedure” (manually or using ESC #).

59	0	Default	Vendor Class
	0	Min	
	1	Max	

Switches identity of the device from Printer Class (7 hex) to Vendor Class (FF hex).

This parameter is used when you want to communicate with an USB printer in Linux without having to install a driver.

The vendor class parameter is normally 0, which sets the TTP 2130 to be a Printer Class device. If you set it to 1, the TTP 2130 will be a Vendor Class device, which means that it will not require a driver but will appear as a file in Linux. You can then communicate with the printer just by writing data to, or reading from, that file.



Caution • When not set to “Printer Class”, no programs that rely on the Windows printer driver will be able to communicate with the printer, and thus not be able to reset the parameter to Printer Class again. To reset the printer to Printer Class:

1. Power OFF the printer
2. Disconnect the USB cable.
3. Open the printhead and remove the paper
4. Hold the Feed button down and power ON the printer with the printhead open.
5. Connect the USB Cable.
6. Save Parameter Settings with <ESC>&<4>.

60	10	Default	Partial Cut Length
	1	Min	
	40	Max	

Sets the length of the partial cuts in mm from the edges of the paper (the blade cuts from the paper edges towards the middle).

The paper width parameter n48 is used to specify the edges of the paper so the printer knows where to start to cut. If parameter n48 is set to auto width, the setting of the TOF sensor selector switch determines the print width and thus also the start position for the partial cut.



Caution • A too large partial cut may cause problems with the presenter, so stay with the default setting if possible.

61

2 Default
0 Min
2 Max**TOF Sensor Mode**

TOF Sensor Mode is set automatically at calibration.

0	All transmitters OFF
1	Reflex sensor mode
2	Gap sensor mode

62

9 Default
0 Min
255 Max**TOF Sensor Mask**

The sensor mask is set automatically at calibration. It will mask away all sensors seeing the guide and is used for the virtual sensor “Paper before head” and will affect paper loading and calibration start. Any raw value will not be affected by the mask.

bit 0	Sensor BM1 in use (edge sensor for 82.5 mm paper)
bit 1	Sensor BM2 in use (center sensor)
bit 2	Sensor BM3 in use (sensor 17.5 mm from center)
bit 3	Sensor BM4 in use (sensor 12.5 mm from center)
bit 4	Reserved, shall be 0.

63

1 Default
0 Min
4 Max**BM Sensor**

Selects which sensor should be used for black mark/gap detection.

<ESC>&P<63><0>	Auto, selects sensor BM1 or BM4 depending on paper width.
<ESC>&P<63><1>	Force the use of sensor BM1 (edge sensor for 82.5 mm paper)
<ESC>&P<63><2>	Force the use of sensor BM2 (center sensor)
<ESC>&P<63><3>	Force the use of sensor BM3 (sensor 17.5 mm from center)
<ESC>&P<63><4>	Force the use of sensor BM4 (sensor 12.5 mm from center)

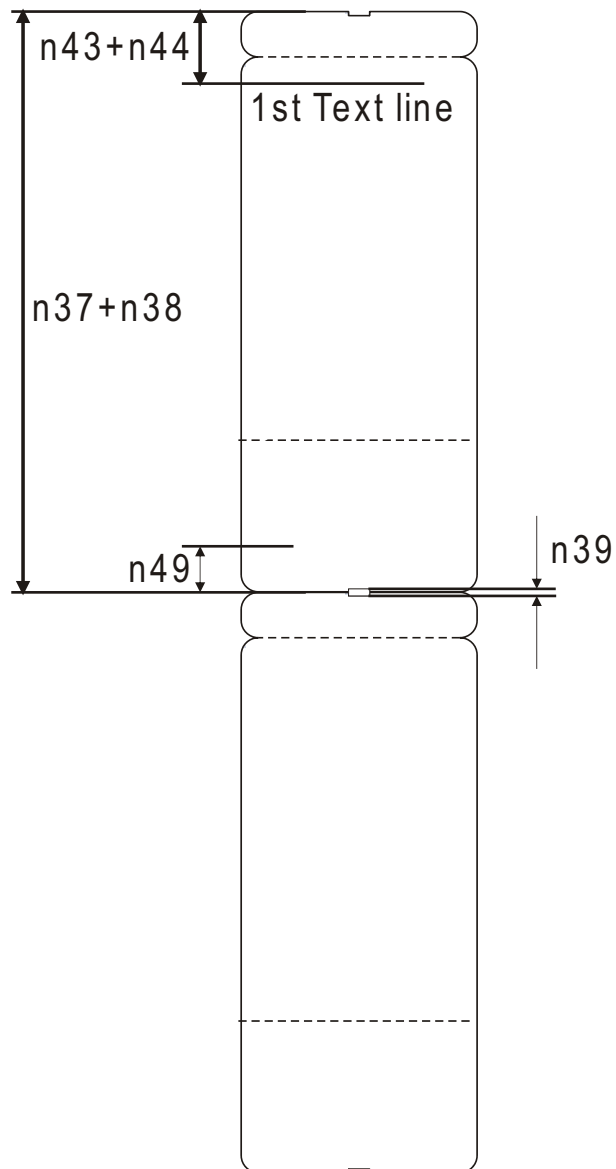


Notes • _____

Page Setup



Printable Area



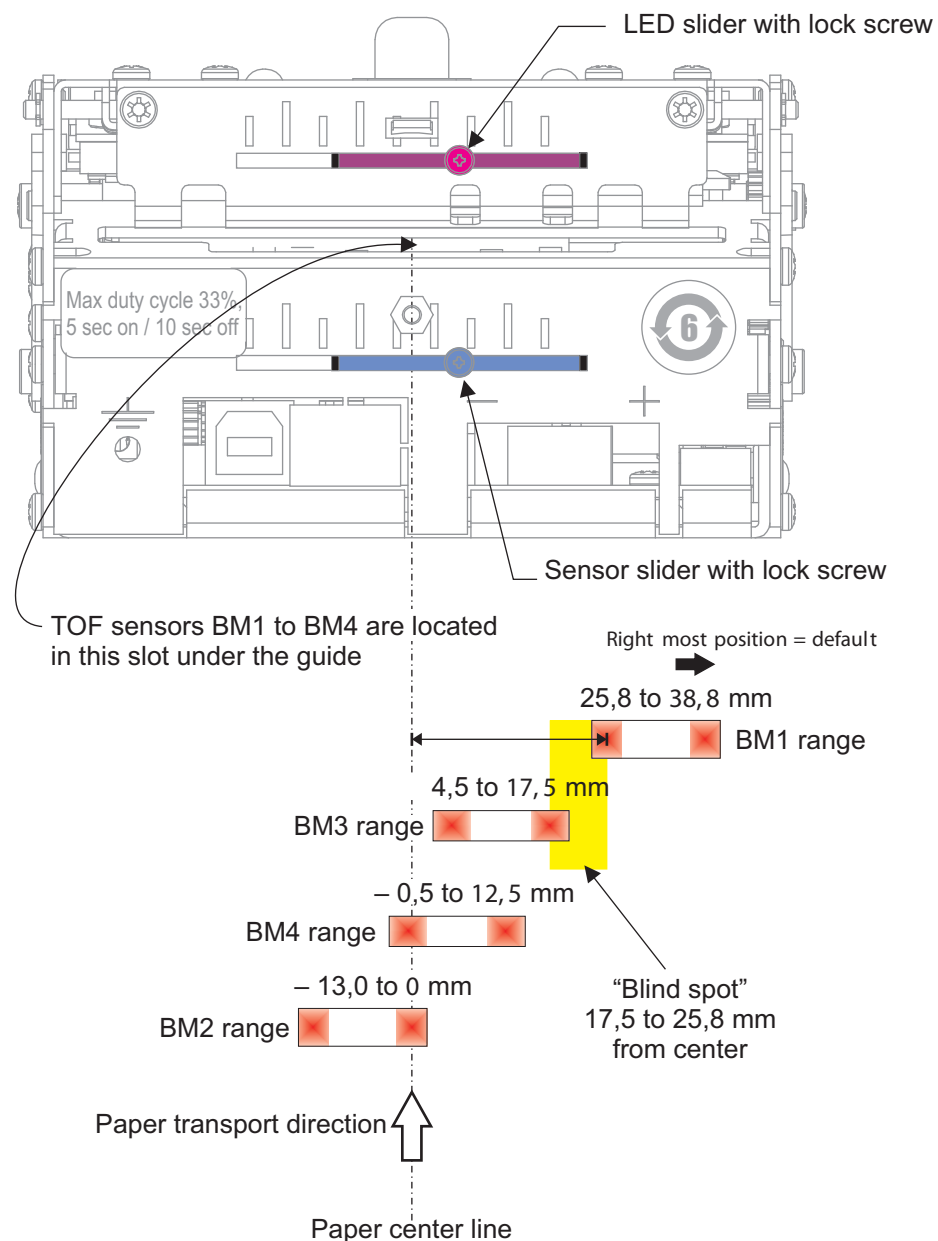
Top margin, bottom margin, page length, and synchronization with preprint are set up with parameters in the printer. In addition to the above, $n41+n42$ are used if the hole or black-mark is not on the desired cut position.

Aligning Preprint and Thermal Print

The printer normally synchronizes the cutting with black marks printed on the back of the paper, punched holes, or gaps in-between tickets. If you use continuous paper without TOF marks, you can disable TOF mark check by setting parameter 35 to 0 and storing the parameters.

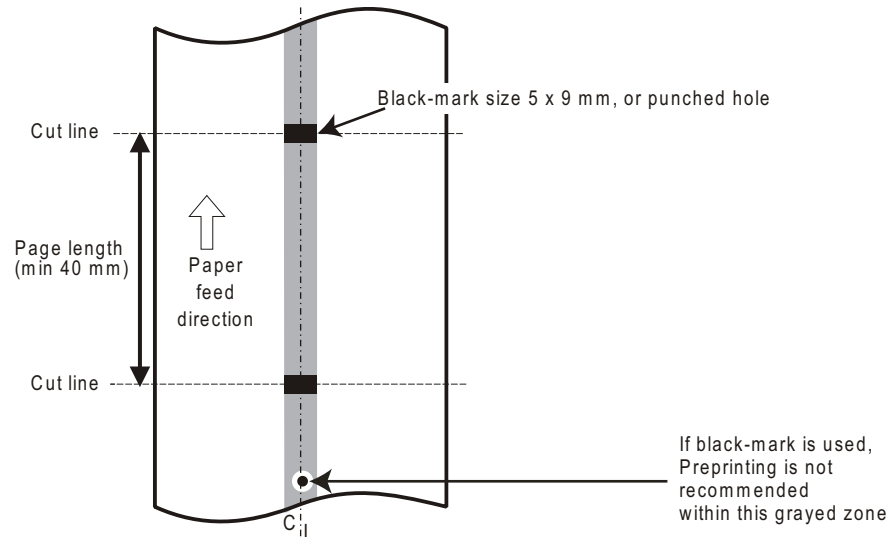
The sensor used to detect the marks is the same sensor as used for paper end detection. Several sensors are provided to take care of most ticket material. If the standard positions at center—12.5 mm, 17.5 mm, and 38.8 mm to the right of center—are not enough, the sensors can be moved up to 13 mm to the right.

Figure 30 • Sensor Positioning



For the best results when designing paper with a TOF mark, place the mark at the center, as this works for any paper width.

Figure 31 • Recommended Black-Mark Size and Position



The sensor measures the length of the black-mark (in the transport direction), and the cut is placed in the middle of the mark.

Since the same sensor is used for both paper end and black-mark detection, the printer must know the length of the black-mark to avoid signaling end-of-paper when it detects a black-mark. When you perform an auto calibration, the printer measures the TOF mark size and stores the values in the parameter memory, so you need not enter any values yourself.



Note • It is essential that you store the parameters in the printer for black-mark synchronization even if you enable black-marks in the Windows driver. This is because Windows is not used at paper loading, and feeding with the FF button on the printer.

Simple Calibration Process

1. Open the printhead
2. Remove ticket stock
3. Hold the Feed button pressed
4. Close the printhead (keeping the button pressed all the time)
5. Release the button, the status LED should be off and the power LED on.
6. Load ticket stock
7. The printer will now forward two tickets and look for TOF marks, then stop and save all TOF-mark parameters.
8. Now open the printhead and remove the ticket stock, close and feed the tickets in again and the printer is ready for use.

Repeat this procedure if the printer should be used with tickets that differ from the original specification.

The following parameters are affected: n37 - n40, n51, n57 bit 3, n58, n61 and n62

FF (Form Feed)

Use FF to print the buffer content, go to the next top of form (black-mark), and cut the paper.

ESC Z (Go To Next Top of Form)

Use ESC Z to move the paper to the next top of form. This is practically a Form-Feed without printing and cut. It searches for the next black-mark for maximum one page length + black-mark length $(256 \times n37 + n38 + n39)/8$. An additional length of 20 mm is added to be sure to pass the edge of the next black-mark. If there is no black-mark within the set distance plus 20 mm, an error is raised.

The commands are used together in the following way:



Example • The following examples are not made for a specific programming language or editor, but can be implemented with the tools of your choice. The data sent **to the printer** are marked with “Send→”.

When setting up the printer:

Send→ <ESC>& P<35><1> Enables black-mark sync

Cut Offset parameters n41 and n42.

Send→ <ESC>&<4> Stores the above parameters as default parameters.

The above sets up and stores the parameters in the EEPROM of the printer, so this needs only be sent once to the printer when setting it up for TOF-mark sync.

Document:

Send→ the text and graphics

At the end of the document:

Send→ ESC Z Feeds the printout to the next black-mark + the additional feed specified by the Cut Offset parameters n41 and n42 command.

Send→ RS Cuts and ejects the printout.

Black-Mark Sensing from within Windows

Refer to the Driver Reference Guide, Part Number P1006873-001, available for download from <http://www.zebra.com> for detailed information on Black-Mark Sensing.



Interface

The printer has one standard interface, and an optional serial interface. There are no selections to be made, but only one interface can be used at a time. The printer will not function properly if data is received on more than one interface at a time.

Serial, TTP 2110

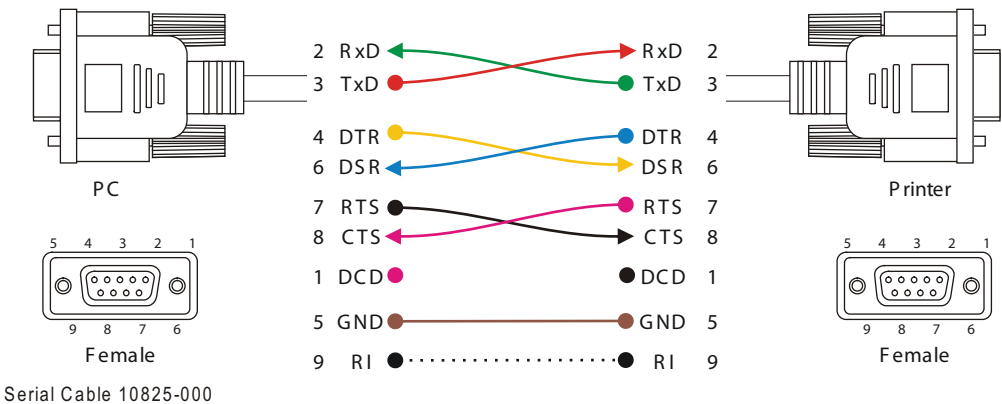


Caution • Using a non-approved cable with the printer may void the FCC and other EMC approvals of the printer.

The RS-232 interface of the TTP 2110 printer has a transfer speed that can be set to between 2 400 and 115 200 bits/s.

Applications where text-only printouts are to be printed are suitable for serial interface because of its easy to use bidirectional capability. The relatively low transfer speed limits the printing speed when printing graphics. Full-width graphics with 115 200 bits/s result in printing speeds of about 24 mm/s for the 80-mm version of the printer.

Figure 32 • Serial connector pin assignment



Setup Options

Parameter	Options
Baud	2 400, 4 800, 9 600, 19 200, 38 400, 57 600, and 115 200 bits/s
Flow control	None, Xon / Xoff, or Hardware
Data bits	7/8
Stop bits	1 (fixed)
Parity	None, Odd, or Even

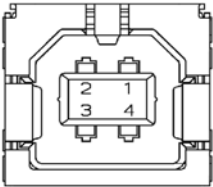
Default Settings: 9600 bit baud, Hardware flow control, 8 Data bits, 1 Stop bit, and no parity.

See also *Default Parameter Settings* on [page 81](#).

USB, TTP 2130

The USB (Universal Serial Bus) is an interface designed to handle peripherals daisy chained to a single connector. The transfer speed is up to 12 Mbits/s, which is quite adequate for the printer. Use this interface in operating systems with USB support, for instance Windows XP. USB devices are Plug and Play compatible and hot swappable, which means that they can be connected and disconnected without turning off the power, or rebooting the computer.

Table 4 • USB Connector (J13) Pin Assignment

	Contact Number	Signal Name	Comment
	1	VCC	Cable power
	2	– Data	
	3	+ Data	
	4	Ground	Cable ground



Notes • _____



Maintenance

Fault Finding / Troubleshooting

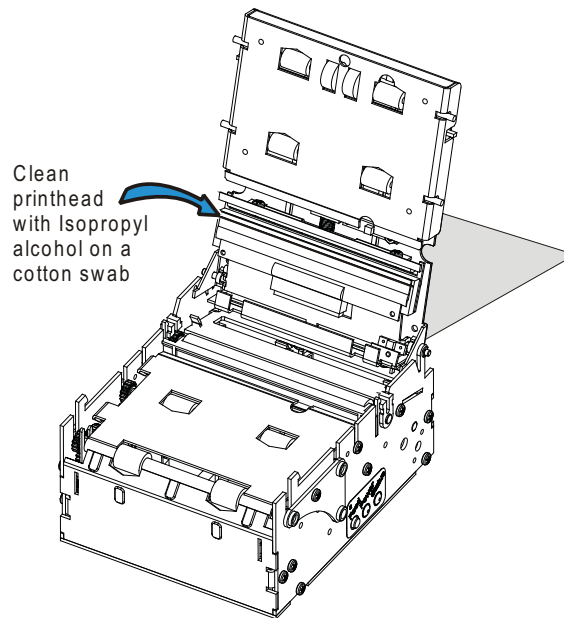
In connection with service of the printer it is good practice to remove paper dust and lint from the paper path, cutter and sensor areas. Paper dust, when accumulated, may interfere with printer functions such as optical sensors.

To avoid smudging the paper, do not apply oil on the cutting knife.

Table 5 • Fault Finding / Troubleshooting)

Symptom	Suggested Actions
Nothing is printed when you press the feed button in self-test mode, but the document is transported, cut and ejected.	• Check that the paper roll is turned the correct way with thermal sensitive layer facing up. • Check that the paper used meets the paper specification • Check that the printhead cable is fully inserted into the connectors at each end.
Paper jam	• Check cutter-home sensor.
Printer does not work at all	• Check that the printhead is closed. • Check that power is supplied to the printer. • Check the function of the paper-out sensor.
Self-test prints OK, but the printer works strangely in normal operation.	• Check that both ends of the interface cable are properly connected. • Application program might be incorrect. Contact system manager.
No cutting	• Check that the connector for the cutting motor is fully seated on the control board.
Bad cutting (uneven top and bottom document edges).	• Switch OFF printer and remove any obstructing paper particles in cutter and presenter modules.
Inconsistent cutter operation	• Check/clean cutter-home sensor.
Missing print or irregular spots.	• Paper may be too humid. Let it adapt to ambient temperature and humidity for approximately 24 hours before use. • The paper used might not meet the paper specification.
White longitudinal lines in the printout.	• Faulty printhead. Replace.
Faint print.	• The paper used might not meet the paper specification. • Clean printhead with ethyl or isopropyl alcohol. • Adjust print contrast, see <i>Print Setup</i> on page 86.
Strange characters or graphics printed, or any kind of strange printer behavior.	• Might be caused by erroneous data sent from the host. Check validity of transferred data.

Cleaning the Printhead



The printhead can be cleaned without removal.

1. Open the printhead.
2. Clean the heat elements with a cotton swab immersed in ethyl or isopropyl alcohol.



Note • Note • Zebra recommends using a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%) to clean the printhead.

Cleaning the Presenter and Platen Rollers

The presenter rollers feed out the receipt to the customer. But the friction between the feed rollers and the pressure rollers is also essential for the function of the pull detector. So make it a rule to clean the presenter and platen rollers whenever media is replaced in the kiosk. Use a cotton swab and isopropyl alcohol and wipe the rollers clean while rotating them with your finger.

Firmware

The firmware is stored in flash-PROM on the control board. A replacement control board may not contain the same firmware version that you are currently using, so if you replace control board for some reason, upgrade it to the firmware version you want to use.

Loading



Note • Always design your kiosk system so that remote upgrade of firmware is possible. If you need to upgrade firmware in the future, the kiosks can be spread over a vast area and upgrade can become very expensive.

1. Download the firmware from the zebra web site <http://www.zebra.com>. There you will also find the Toolbox utility program (Windows™ software) facilitating the loading of the firmware into the printer.
2. Are you using a Windows environment to load the firmware?

If...	Then...
No	a. Send <ESC><NUL> (1BH 00H) to the printer. b. Wait 0.5 seconds. c. Send the firmware file to the printer. d. Wait until the printer buzzes to confirm that the loading is complete (the presenter motor runs for a second).
Yes	The loader program contains a help file with detailed instructions on how to load the firmware into the printer.



Caution • The loading and burning can take up to one minute. Do not abort before one minute by turning OFF the power to the printer. Doing so may leave the printer in a state where new firmware cannot be loaded. If this happens, please return the printer to a Zebra authorized service provider or repair center.

Firmware Identification

Functions and features are being added from time to time affecting the firmware in the printer.

Please visit the Drivers and Downloads section of our web site <http://www.zebra.com> for current firmware versions and release notes.

Make a self-test printout to determine which firmware version you have in your printer. The firmware number is divided into two sections, the header and the version, separated by a dash.

Printer	Bar Code Support	Firmware Header
TTP 2110	1D bar codes	1824-xxx
TTP 2110	2D PDF-417	1826-xxx
TTP 2130	1D bar codes	1823-xxx
TTP 2130	2D PDF-417	1825-xxx

A printer can only be updated with firmware that has the same header as the original number.

The -xxx indicates the firmware version. For example, 350 means firmware version 3.50.



Notes • _____



Specifications



Important • Specifications subject to change without notice.

Ticket Specifications

Ticket materials	Paper, laminate, plastic, and label stock.					
Ticket widths	50.8 mm 2 in.	53.98 mm 2.125 in. ISO credit card	60 mm 2.333 in.	66.3 mm 2.61 in. dollar bill	80 mm 3.167 in.	82.5 mm 3.25 in. ATB airline ticket
Paper thickness	0.28 mm 11 mils			0.18 mm 7 mils		
Ticket length		85.6 mm for ISO 7811, and up to 19 in for baggage tags		156 mm		203.2 mm
Ticket length in text mode	25 cm			17 cm		
	Min. 40 mm, Max depends on free RAM and print width					
Ticket length in driver mode	Min. 40 mm, Max 534 mm (1.37 to 21 in.)					
Paper weight	80 – 240 g/m ² depending on thickness, see above					
Paper supply	Roll, fan-fold paper, or hand fed single cut					
Roll diameter	Max 184.2 mm (7.25 in.)					
Spindle diameter	50 mm minimum, recommended 76.2 mm (3 in.)					
Fanfold tickets	Straight or with corner radius					
Label stock	With punched hole, or opaque space, variable length. Carrier must be at least 0.5 mm wider than the label on both sides.					

TOF Detection

Handles the following Top of Form-indicators:

1. Gap in-between tickets, Gap length from 6 mm down to 1.59 mm
2. Black-marks on the non thermal side of the ticket stock
3. Label gap (for labels on backing/liner) Length from 6 mm down to 3.175 mm. Optical translucency of backing shall be a minimum of 57%, while maximum optical translucency of label is 18% including backing paper, adhesive and face material.
4. Corner radius down to 3.15 mm
5. Fixed length without TOF indicator
6. Variable length without TOF indicator

Features

- Cut is placed in the middle of the TOF-mark regardless of mark length
- It is possible to detect the TOF mark before reaching the end of the document
- Auto loads ticket material without wasting a ticket
- Fully prints and eject last ticket in ticket stock
- Conforms to IATA Resolution 740 for baggage tag TOF detection.

Print Module

Resolution	8 dots/mm (203 dpi)
Print speed	Up to 150 mm/s
Print duty cycle	Up to 33%, (5s on, 10s off)
Max print width	Max 640 pixels = 80 mm. Selectable through parameter n48.
Life Expectancy	100 km paper (= about 1 000 000 85.6 mm tickets) 1x10 ⁸ pulse lines (typically)

Ticket Separation

The separator is able to cut roll paper and separate fanfold paper in perforations already in the ticket stock.

Guillotine cutter	Yes
Partial cut	Yes, Parameter selects the size of the cut.
Life Expectancy	1 000 000 cuts for 54 mm wide 0.18 mm thick paper (typically)

Presenter

Straight presenter with two modes:

Mode 1	Holds the ticket by its back end
Mode 2	Ejects ticket fully so it falls down and leaves the printer
Retract	No
Life Expectancy	1 000 000 tickets of 85.6 mm length (typically)

Electronics

Interfaces	Serial RS 232	115200 bps (TTP 2110)
	USB	Version 1.1 (TTP 2130)
TOF sensors	Selectable between light-barrier (transmissive) and reflex (black mark) type detectors.	

Firmware

Driver mode	Yes, Windows XP
Text Mode	Yes
Emulations	No

Text Mode

Orientation	Portrait and Landscape
Standard fonts	ATM9 (40 characters/line at 72 mm width), OCR-B 10 and 12
Text attributes	Underline, Bold, Italics, reverse print, multiple width and height
Character set	224 printable characters out of a 255-character space. Default character sets should use Windows Code Page 1252 (Western). Possible to use other code pages if new fonts are loaded.
Bar codes	Standard: EAN-13, UPC, Interleaved 2-of-5, ISBN, Code 39, and Code 128. Optional PDF417.
Graphics	Logotypes and b&w BMP-files

Miscellaneous

Versions	Kiosk print mechanism and desktop version
Environment	0°C to +50°C, 35% to 75% RH, non-condensing
Size	Mechanism: approx 107 x 71 x 127 mm (W x H x D) + 67 mm for input guide
Desktop	approx 117 x 85 x 137 mm (W x H x D) + 63 mm for input guide
Weight	approx. 1.2 kg for mechanism and 1.4 kg for Desktop
Power requirements	24 Vdc $\pm$ 5% 70W average (2.92A) and 284W peak (11.8A) power supply

Basic Character Set

The default fonts use Windows code page 1252 Western which contains ISO 8859-1 (ANSI) characters. You can use other character sets by creating and loading appropriate font files.

Characters 0 to 31 are control codes that cannot be changed, but 32 to 255 can be custom designed.

The table below shows the characters stored in flash PROM on the printer control board.

Table 6 • Code Page 1252 Character Table

Dec Hex Key	32 20	33 21 !	34 22 "	35 23 #	36 24 \$	37 25 %	38 26 &	39 27 '	40 28 (	41 29)	42 2a *	43 2b +	44 2c ,	45 2d -	46 2e .	47 2f /
Dec Hex Key	48 30 0	49 31 1	50 32 2	51 33 3	52 34 4	53 35 5	54 36 6	55 37 7	56 38 8	57 39 9	58 3a :	59 3b ;	60 3c <	61 3d =	62 3e >	63 3f ?
Dec Hex Key	64 40 @	65 41 A	66 42 B	67 43 C	68 44 D	69 45 E	70 46 F	71 47 G	72 48 H	73 49 I	74 4a J	75 4b K	76 4c L	77 4d M	78 4e N	79 4f O
Dec Hex Key	80 50 P	81 51 Q	82 52 R	83 53 S	84 54 T	85 55 U	86 56 V	87 57 W	88 58 X	89 59 Y	90 5a Z	91 5b [	92 5c \	93 5d)	94 5e ^	95 5f _
Dec Hex Key	96 60 , ,	97 61 a	98 62 b	99 63 c	100 64 d	101 65 e	102 66 f	103 67 g	104 68 h	105 69 i	106 6a j	107 6b k	108 6c l	109 6d m	110 6e n	111 6f o
Dec Hex Key	112 70 p	113 71 q	114 72 r	115 73 s	116 74 t	117 75 u	118 76 v	119 77 w	120 78 x	121 79 y	122 7a z	123 7b {	124 7c 	125 7d }	126 7e ~	127 7f A0127
Dec Hex Key	128 80 A0128	129 81 A0129	130 82 A0130	131 83 A0131	132 84 A0132	133 85 A0133	134 86 A0134	135 87 A0135	136 88 A0136	137 89 A0137	138 8a A0138	139 8b A0139	140 8c A0140	141 8d A0141	142 8e A0142	143 8f A0143
Dec Hex Key	144 90 A0144	145 91 A0145	146 92 A0146	147 93 A0147	148 94 A0148	149 95 A0149	150 96 A0150	151 97 A0151	152 98 A0152	153 99 A0153	154 9a A0154	155 9b A0155	156 9c A0156	157 9d A0157	158 9e A0158	159 9f A0159
Dec Hex Key	160 a0 A0160	161 a1 A0161	162 a2 A0162	163 a3 A0163	164 a4 A0164	165 a5 A0165	166 a6 A0166	167 a7 A0167	168 a8 A0168	169 a9 A0169	170 aa A0170	171 ab A0171	172 ac A0172	173 ad A0173	174 ae A0174	175 af A0175
Dec Hex Key	176 b0 A0176	177 b1 A0177	178 b2 A0178	179 b3 A0179	180 b4 A0180	181 b5 A0181	182 b6 A0182	183 b7 A0183	184 b8 A0184	185 b9 A0185	186 ba A0186	187 bb A0187	188 bc A0188	189 bd A0189	190 be A0190	191 bf A0191
Dec Hex Key	192 c0 A0192	193 c1 A0193	194 c2 A0194	195 c3 A0195	196 c4 A0196	197 c5 A0197	198 c6 A0198	199 c7 A0199	200 c8 A0200	201 c9 A0201	202 ca A0202	203 cb A0203	204 cc A0204	205 cd A0205	206 ce A0206	207 cf A0207
Dec Hex Key	208 d0 A0208	209 d1 A0209	210 d2 A0210	211 d3 A0211	212 d4 A0212	213 d5 A0213	214 d6 A0214	215 d7 A0215	216 d8 A0216	217 d9 A0217	218 da A0218	219 db A0219	220 dc A0220	221 dd A0221	222 de A0222	223 df A0223
Dec Hex Key	224 e0 A0224	225 e1 A0225	226 e2 A0226	227 e3 A0227	228 e4 A0228	229 e5 A0229	230 e6 A0230	231 e7 A0231	232 e8 A0232	233 e9 A0233	234 ea A0234	235 eb A0235	236 ec A0236	237 ed A0237	238 ee A0238	239 ef A0239
Dec Hex Key	240 f0 A0240	241 f1 A0241	242 f2 A0242	243 f3 A0243	244 f4 A0244	245 f5 A0245	246 f6 A0246	247 f7 A0247	248 f8 A0248	249 f9 A0249	250 fa A0250	251 fb A0251	252 fc A0252	253 fd A0253	254 fe A0254	255 ff A0255
		ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Part Number List

Printers

Printer Model/Type	NA/LA/AP	EMEA
TTP 2110 Ticket Printer, Serial, Embedded	01991-000	01991-000
TTP 2130 Ticket Printer, USB, Embedded	01993-000	01993-000
TTP 2110 Ticket Printer, Serial, Desktop	01991-100	01991-100
TTP 2130 Ticket Printer, USB, Desktop	01993-100	01993-100
Evaluation Kit, TTP 2100 Ticket Printer, Serial, Embedded	N/A	01991-800
Evaluation Kit, TTP 2130 Ticket Printer, USB, Embedded	N/A	01993-800
Evaluation Kit, TTP 2130 Ticket Printer, USB, Desktop	N/A	01993-801

Accessories

Item	NA/LA/AP	EMEA
Paper Guide Kit 51 mm	01990-051	01990-051
Paper Guide Kit 54 mm	01990-054	01990-054
Paper Guide Kit 60 mm	01990-060	01990-060
Paper Guide Kit 66 mm	01990-066	01990-066
Paper Guide Kit 80 mm	01990-080	01990-080
Paper Guide Kit 82.5 mm	01990-082	01990-082
Paper Guide Kit 82.5 + 54 mm	N/A	01990-400
Media holder, roll and fanfold	104877	104877
Paper-low sensor with 300 mm cable	01890-300	01890-300
Quick-fit hub kit with screws	103939	103939
Leaf spring retainer for quick-fit hubs	01473-000	01473-000
Output tray	104385	104385
Credit card sized ticket, Gapped, box of 3500	N/A	01770-000
Ticket, ATB blank, box of 1000	N/A	01807-000
RS232 serial cable	10825-000	10825-000
USB cable 1.8 m (6 ft.)	105850-028	105850-028
Power supply 24V, 70W (for general printing)	01776-000	01776-000
Power supply 24V, 150W with on/off switch (for printing large graphics)	S-150-24SW	01035-014
Power supply to printer cable, 600mm (Requires installation by a qualified engineer.)	01370-000	01370-000
AC Power Cable	300020-001 (US)	46629 (EU) 46637T (UK)

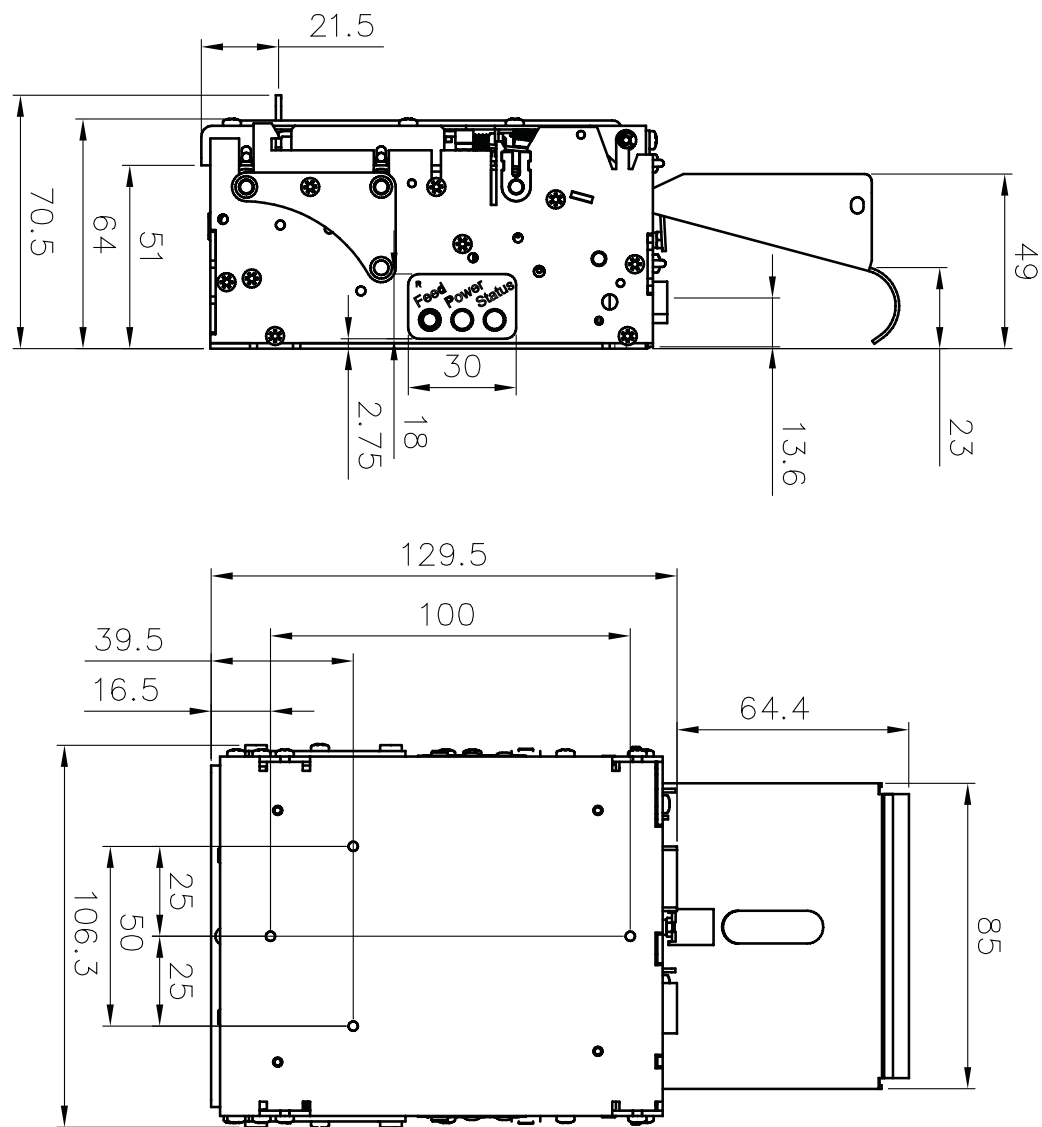
Dimensions

Printer



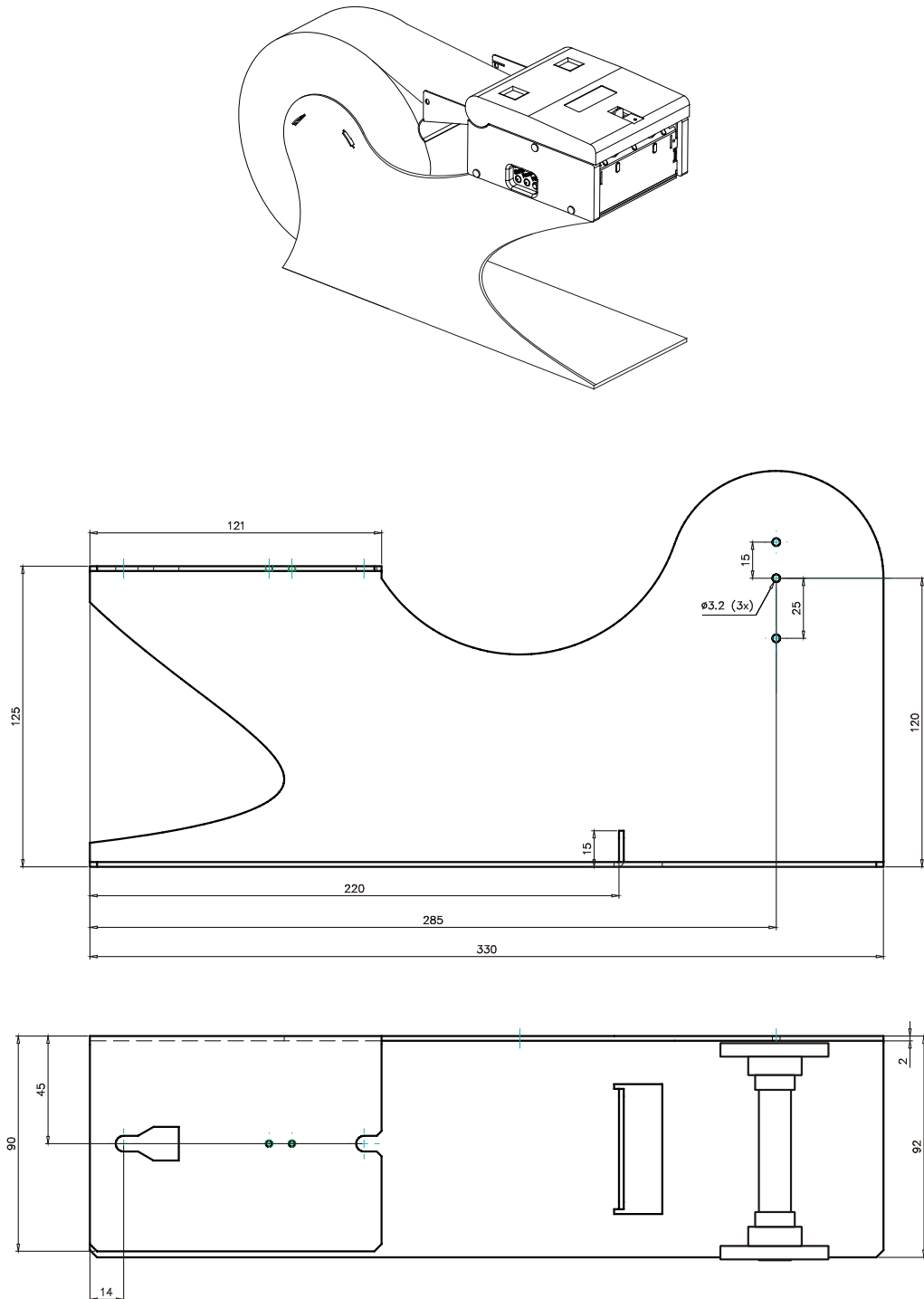
Note • Additional space is required for paper roll and handling.

Figure 33 • Measurements Drawing



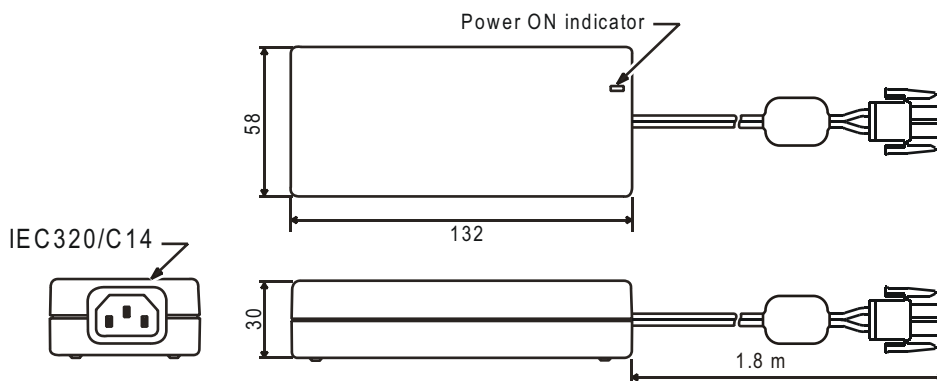
Media Holder

The media holder can take both fanfold and roll ticket stock. The roll shaft has three levels so it supports 54 mm, 60-66 mm, and 80-82.5 mm media, and rolls up to 180 mm in diameter.



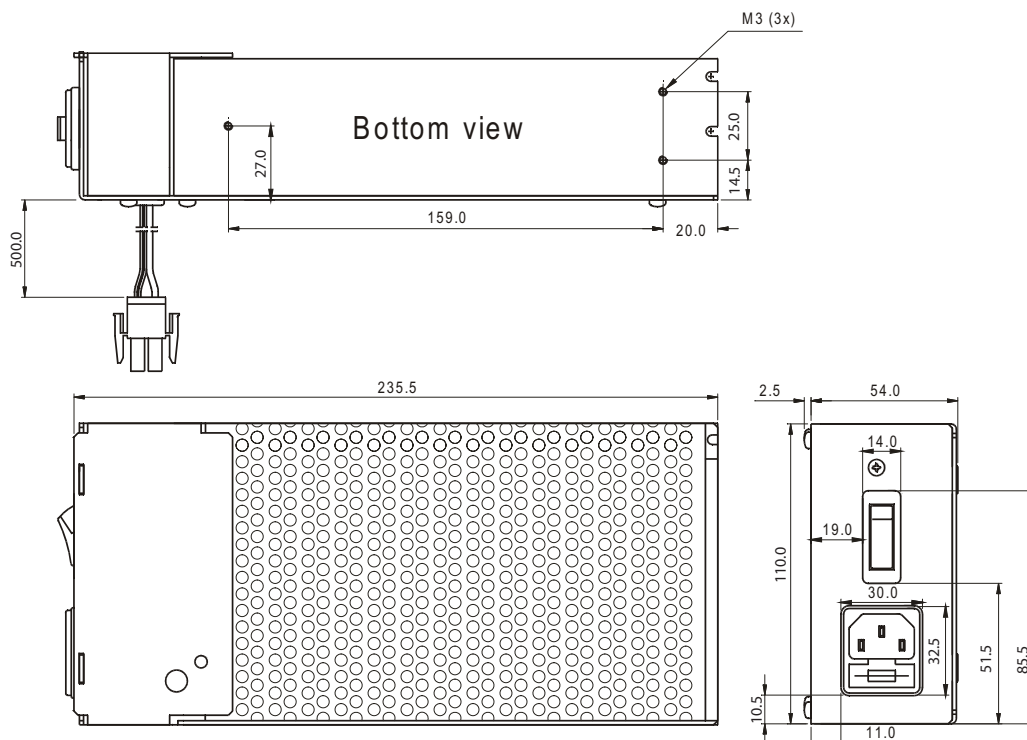
70W Power Supply

Figure 34 • Measurements of 70W PSU



150W Power Supply

Figure 35 • Measurements of 150W PSU





中国 RoHS 材料声明 (China RoHS Material Declaration)

部件名称	有毒 / 有害物质或元素					
	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电子组件 (Electronics)	X	O	O	O	O	O
驾驶火车 (Drive Train)	X	O	O	O	O	O
紧固件 (Fasteners)	X	O	O	O	O	O
打印头 (Printheads)	X	O	O	O	O	O

- X 表示该部件的某一均质材料中的有毒有害物质的含量超出 SJ/Txxx-2006 标准规定的限量要求。
(Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.)
- O 表示不含有此类物质或此类物质的含量在上述标准规定的限量要求以下。
(Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.)



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